British Birds

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R. K. Cornwallis

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(with four plates)

Foot-movements in plovers and other birds
K. E. L. Simmons

Recent reports and news

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January 1961

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AN ILLUSTRATED MONTHLY JOURNAL

Edited by

P. A. D. Hollom E. M. Nicholson
I. J. Ferguson-Lees Stanley Cramp

Photographic Editor: Eric Hosking

Hon. Editors: W. B. Alexander N. F. Ticehurst

Editorial Address: 30 St. Leonard's Avenue, Bedford

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British Birds

Vol. 54 No. 1

JANUARY 1961

Four invasions of Waxwings during 1956-60

By R. K. Cornwallis

INTRODUCTION

THE WAXWING (*Bombycilla garrulus*) has a Holarctic breeding distribution in the boreal zone (see Fig. 1) reaching the July isotherm of 50° F and extending from Fenno-Scandia right across the Eurasian land-mass and into north-western America. There are three recognised races: the nominate race in western Eurasia; *B. g. centralasiae* eastwards from western Siberia; and *B. g. pallidiceps* in the Nearctic. In central and eastern North America it is replaced by another member of the genus, the Cedar Waxwing (*B. cedrorum*), and in northern Manchuria, Sakhalin Island and Japan by a third, the Japanese Waxwing (*B. japonica*).

Throughout its range it is noted for its irregular winter migrations. Britain and Ireland, lying on the extreme Atlantic edge of even the extended winter range, are reached by these winter migrations only occasionally and when they are on an unusually large scale, though a few Waxwings occur in eastern counties in most years. In the winters between 1956-57 and 1959-60, however, there were four successive invasions of our islands, a series unprecedented since records have been kept. In the following pages their progress both in Britain and Ireland and in Scandinavia is described and the underlying causes of this type of migration are discussed.

PART I—THE INVASIONS

1956-57

The 1956 breeding season in Scandinavia

During the summer of 1956 Waxwings were recorded as breeding in Scandinavia (well to the south-west of the normal range) in unusual numbers. The main concentration was along the Swedish shore of the Gulf of Bothnia, but birds were also reported from a wide area of central Scandinavia and even as far south as Stockholm.

FIG. 1. Normal breeding range of the Waxwing (*Bombycilla garrulus*) in north-east Europe, northern Siberia and north-western North America, shown in black. The ranges of the other two members of the genus, the Cedar Waxwing (*B. cedrorum*) and Japanese Waxwing (*B. japonica*), are also roughly indicated

In the previous winter of 1955-56 Waxwings were not numerous in Sweden and it seems unlikely that these breeding birds were left over from the winter-flocks, as has usually happened when they are found breeding outside the normal areas. It seems more probable that there was an overflow movement in the early spring from Finland and the Archangel area where heavy breeding was reported. This is supported by a record of a southerly movement in spring in Ångermanland in central Sweden (Hansson and Wallin 1958).

The progress of the invasion in autumn 1956

The autumn of 1956 was one of superabundance of rowan berries (*Sorbus aucuparia*) over the whole of Fenno-Scandia and the north-western parts of the Baltic countries, but in most parts of the Soviet Union they were scarce. In spite of the rich food supply in the

breeding areas of Fenno-Scandia many Waxwings appear to have emigrated very early compared with most seasons. Already in October there were considerable concentrations in northern Sweden and in the Stockholm area, and in November and December these concentrations became widespread over the whole of central and northern Sweden.

It has been possible to trace the origin of the flocks comprising the invasion to two separate areas, one in Scandinavia and one further east (Hansson and Wallin 1958). The earlier concentrations that gathered in Sweden in October, November and December appear to have come from the abundant breeding that took place, as has already been shown, in the western part (and beyond) of the normal range. By 1st January some 10,000 birds were concentrated in Östersund (central Sweden). During the last week of December and the first week of January there was a further concentration in southern Finland where Waxwings had previously been rather scarce. It seems reasonable to suppose that these birds came from further east, where the berry supply was poor, but it may well be that before their appearance in southern Finland they had been arrested for a time in the area between the White Sea and Finland where berries were abundant. Breeding birds in the Archangel area were reported to have emigrated early and probably moved into this region.

The wave of Waxwings coming from the east culminated along a line from Haparanda (at the head of the Gulf of Bothnia) to Leningrad (at the head of the Gulf of Finland) about 15th January, at the same time as the concentration of flocks reached its maximum in northern Sweden where, on the 13th, there were 10,000 in the Kalix area at the head of the Gulf of Bothnia.

Thereafter the concentrations of Waxwings resulted in exhaustion of the berry supply and the birds began to move. It has been possible to trace the movements of the two contingents by successive culminations in numbers in different places. One part of the influx from the east followed the Gulf of Finland directly westwards into central Sweden, while another flowed north of the Gulf of Bothnia and down along the east coast of Sweden, spreading a little inland to central Scandinavia. The Scandinavian contingent, on the other hand, moved in a south-easterly direction, meeting or crossing the westward inflow in Uppland and the valley of Lake Mälaren (immediately to the west of Stockholm). This caused a remarkable concentration of Waxwings in this area and by 4th February there were 10,000 in Uppsala (the province immediately north of Stockholm).

These movements continued and developed in mid-February into a westward and south-westward overflow out of Scandinavia. This overflow took two main directions, one across southern Norway and reaching eastern Britain, the other via Denmark and Gotland down to

central Europe and, especially, to northern Germany and the Netherlands. These probably represent respectively the westerly and south-easterly streams described above. Waxwings were noted in Rogaland, at Revtangen and at Lillehammer (north of Oslo) (all in southern Norway) from early February; and the main arrivals in Britain occurred between 11th and 20th February. An illustration of this westerly movement is provided by a bird that was ringed on Signilskär (the Finnish bird observatory on the Åland Islands midway between Sweden and Finland at the level of Stockholm) on 7th December and recovered near Oslo on 27th February. The other movement took place at about the same time, the first birds being reported from the Frisian Islands on 8th February and numbers building up rapidly in Holland from the 16th (Taapken 1958). A ringing recovery illustrates this movement also, a bird marked in Uppsala on 4th February (the date when the maximum concentration in that area occurred, as mentioned above) being found in mid-Baltic at Visby (on Gotland) on 17th March.

Not all the birds left Sweden, however, and large numbers remained there in the second half of February and throughout March. The supply of rowan berries was by now becoming exhausted, but, in contrast to their behaviour earlier, when they moved out of central Sweden as this food became scarcer, birds that remained now turned increasingly to emergency foods. An example of a bird that did not move far is one ringed in Uppsala on 4th February (the same day as the one recovered on Gotland) which was recovered near Stockholm on 24th February (Hansson and Wallin 1958).

The invasion in Britain during February and March 1957

Early forerunners of the main invasion were noted in late January when 18 were reported from Dunkeld (Perthshire), two from Aberfeldy (Perthshire) and some 200 from Pegswood (a suburb of Newcastle upon Tyne, Northumberland). Unfortunately none of these early reports is well-documented and certainty about dates is not possible. In early February two were recorded at Lossiemouth (Morayshire) on the 3rd and six from Duffus near-by on the same day.

The main invasion, however, seems to have started on 11th February. On this day one was found dead in Orkney and on the next day there were records from Fair Isle, Orkney and eastern Sutherland. By the 17th (which was a Sunday and therefore probably gave extra opportunities for observations) Waxwings were established all down the east coast, being widely reported in the eastern Highlands, the eastern Lowlands, Northumberland, Co. Durham and south to Lincolnshire, Norfolk and Essex. The majority of these birds were singletons or in small parties, but the large party at Pegswood was still together. The 19th saw a crop of new reports, 17 passing at Spurn Observatory

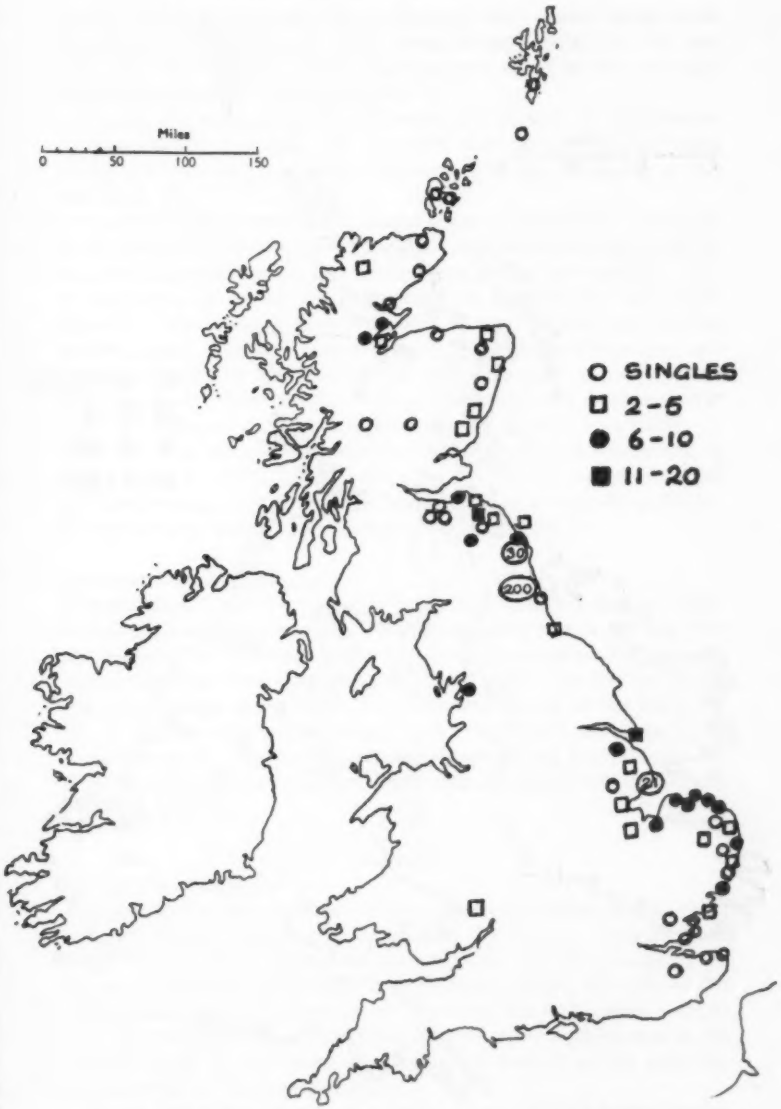


FIG. 2. Waxwings (*Bombycilla garrulus*) in Britain, 11th-20th February 1957

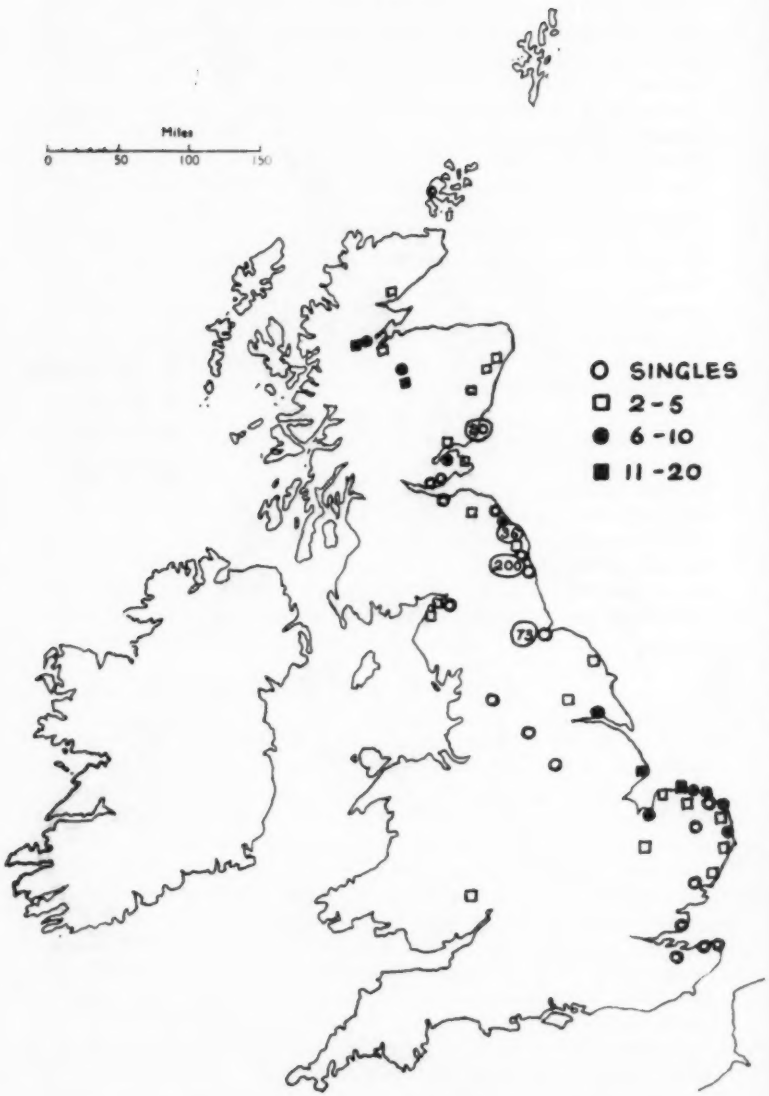


FIG. 3. Waxwings (*Bombycilla garrulus*) in Britain, 21st-28th February 1957

(south Yorkshire), 21 arriving at Skegness and others being noted elsewhere in Lincolnshire. Birds were almost confined to the east coast, the chief exception being six that were noted on the 18th near Yealand (north-west Lancashire) (Fig. 2).

During the week 21st-28th February the pattern of distribution remained much the same, but the birds were gathering into larger flocks. A few stragglers were reported from the Midlands at this time (Fig. 3).

In early March concentration became even more marked, particularly in the Inverness, Fenwick (Northumberland), Pegswood and Middlesbrough (Yorkshire) areas, but further south there were already signs of dispersal, far fewer being recorded in Lincolnshire and north Norfolk. The main parties here were in east Norfolk and on the Suffolk coast. During the second and third weeks of March the numbers of reports fell steadily, though there were still 20 in Gosforth Bird Sanctuary, Newcastle upon Tyne, on the 30th and 14 were seen at Boat of Garten near Aviemore (Inverness-shire) on the 31st (Fig. 4). This area also saw the last recorded flock (of 42 in Rothiemurchus) on 11th April, although odd birds were reported from Carlisle, Hull and Scarborough in April and the latest report of all came from Quorn (Leicestershire) where there were two on 26th April.

Return movements in spring 1957

The return movements in Sweden began in March, but reached extensive proportions only in April. Waxwings were seen to fly out over the sea from the coast of Uppland, indicating a considerable strength of the migratory urge (Hansson and Wallin 1958). In Holland much the same pattern as in Britain was observed—most of the birds left by mid-March with a few stragglers in late March and into April (Taapken 1958). By the end of April almost all had moved away out of western Europe and Scandinavia, presumably back to their northern breeding grounds.

1957-58

The 1957 breeding season

As noted above, there was an extensive return movement of Waxwings through Sweden in March and especially April 1957. Not all these birds, so it appears, regained the normal easterly breeding range of the species. For once again there was extensive nesting this side of the usual areas. But, whereas in 1956 these extra-limital breeders seem to have moved westwards in the spring because of over-population in the normal range, in 1957 they were birds left over from the great invasion flocks of the previous winter.

There were two main areas of density—one in central Sweden around the 64° parallel and another north of the Arctic Circle on the 68°

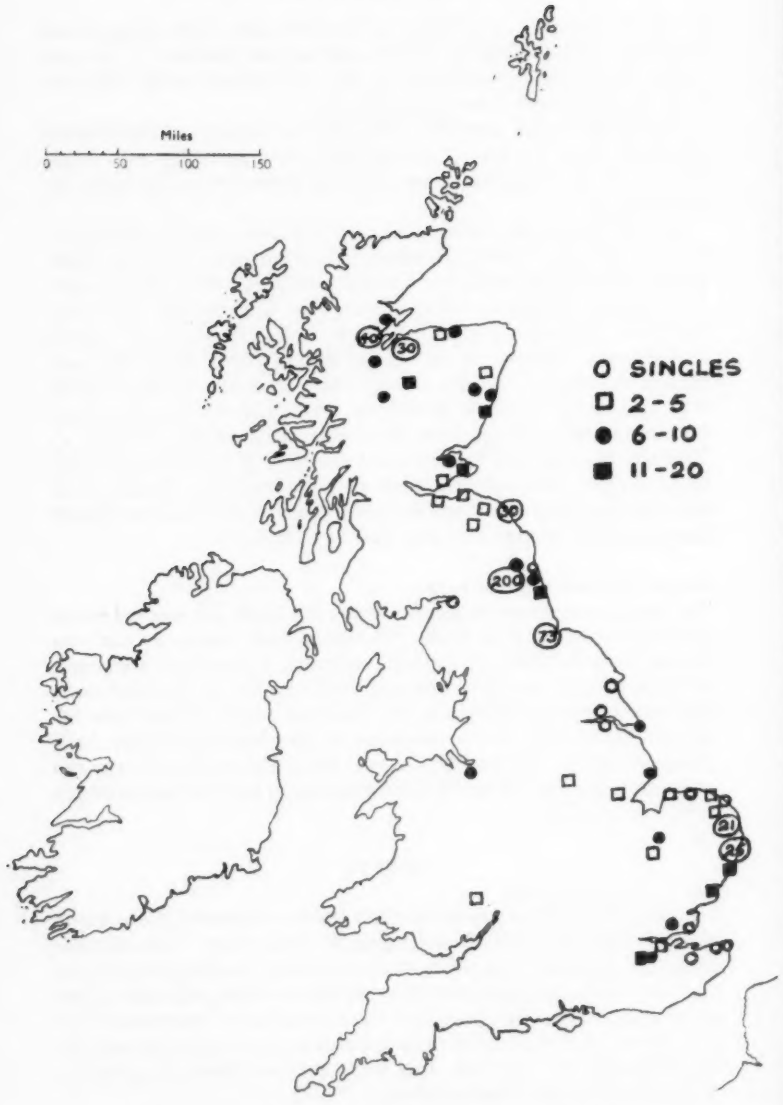


FIG. 4. Waxwings (*Bombycilla garrulus*) in Britain, March 1957

parallel. In addition, however, many pairs of Waxwings were noted even south of a line Oslo-Stockholm (L. Wallin *in litt.*).

The progress of the invasion in autumn 1957

As Svärdson (1957) had predicted, the crop of rowan berries in the autumn of 1957 was almost a total failure in Fenno-Scandia as a result of exhaustion following the very heavy crop of 1956. In consequence, the passage of the Waxwing flocks through Sweden was very rapid and, indeed, difficult to observe, since the birds did not stay anywhere for any length of time. That at any rate some of the migration took place at night was established by observations made at Falsterbo. The movements recorded were also rather early in the season, no doubt as a result of early exhaustion of the food supply in the breeding areas themselves. The only considerable numbers were noted at Signilskär on the Åland Islands. Here, on Gotland and elsewhere on a much smaller scale the principal movements were noted in the second half of October. The migratory flocks, therefore, moved early and uninterruptedly out of the breeding range until they found food supplies, the fore-runners of the invaders to Britain being noted in the first week in November and the flocks being well-established by the middle of the month (L. Wallin *in litt.*).

The invasion in Britain and Ireland from November 1957 to March 1958

The first indications that a new immigration of Waxwings to Britain and Ireland was under way came in the first week of November, the earliest records being from the southern Highlands and, rather remarkably, from the north of Ireland and west Wales (single birds at Downpatrick and Dolgelly on the 5th and 3rd respectively). By the 10th records were becoming more numerous and birds had been reported from places as widely apart as Shetland, Rhum, Cumberland, Lancashire, North Wales, Pembrokeshire, Essex, London, Norfolk, Leicestershire, Co. Durham and East Lothian. During the rest of the month numbers built up rapidly, the main concentrations being in the Moray Firth area, all down the eastern seaboard of Scotland from Aberdeen to the border, around Newcastle upon Tyne and in Norfolk and Suffolk. On the 22nd, 150 were seen coming in off the sea at Tweedmouth and 25-30 left the Farne Islands on the 24th, heading for the mainland. In contrast to the invasion of the previous winter, records were commoner away from the east coast and during the second half of the month numbers had been reported from North Wales and the Midlands and a scatter of single birds along the south-west coast as far as Plymouth (Devon) (Fig. 5).

During December, although the main concentrations remained in much the same places all down the east coast, the total numbers involved steadily diminished. Scattered reports continued to come from

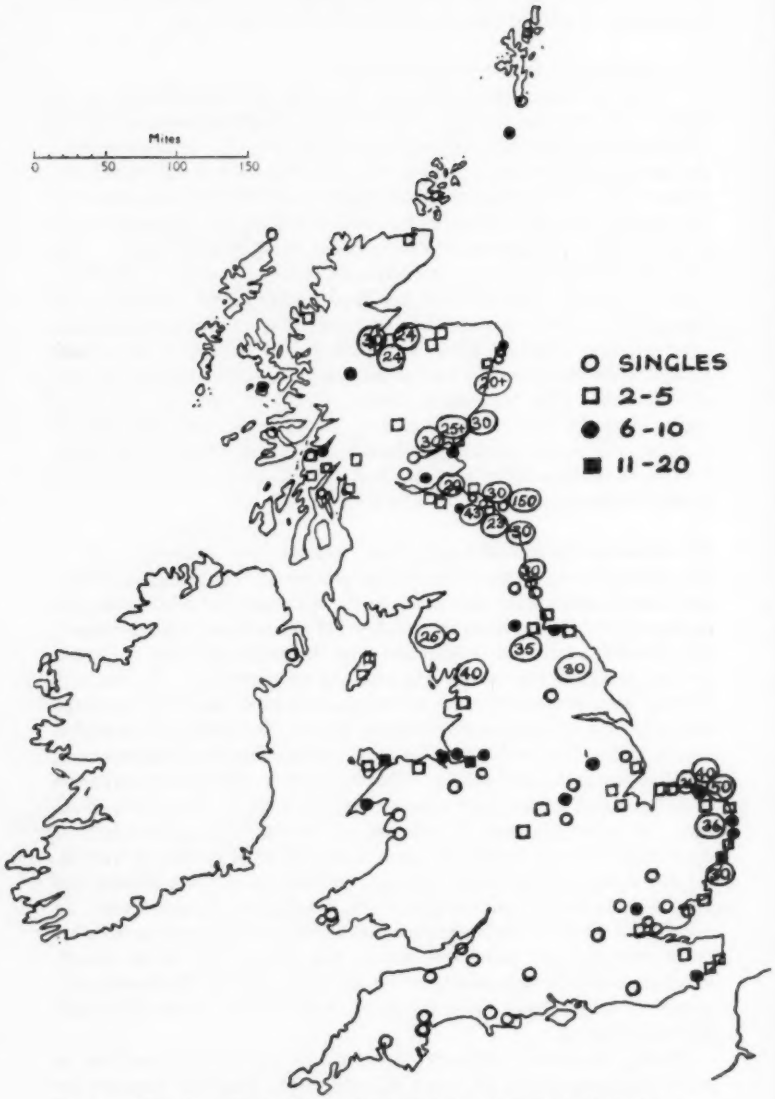


FIG. 5. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, November 1957

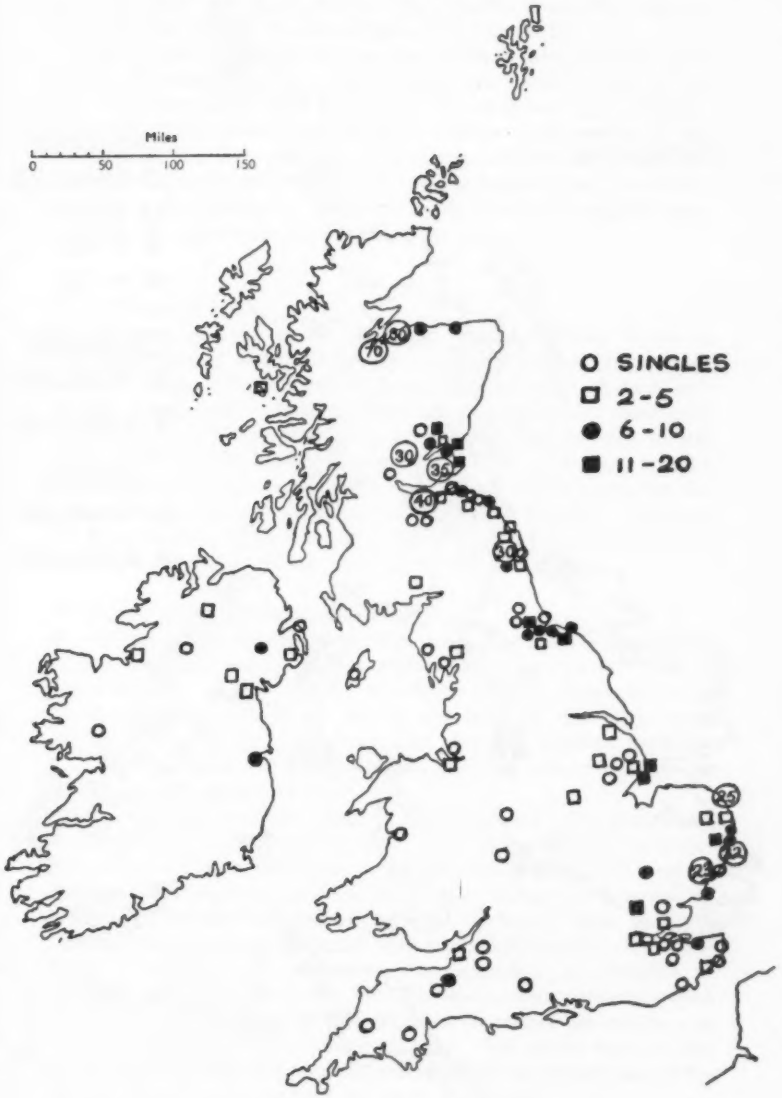


FIG. 6. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, December 1957

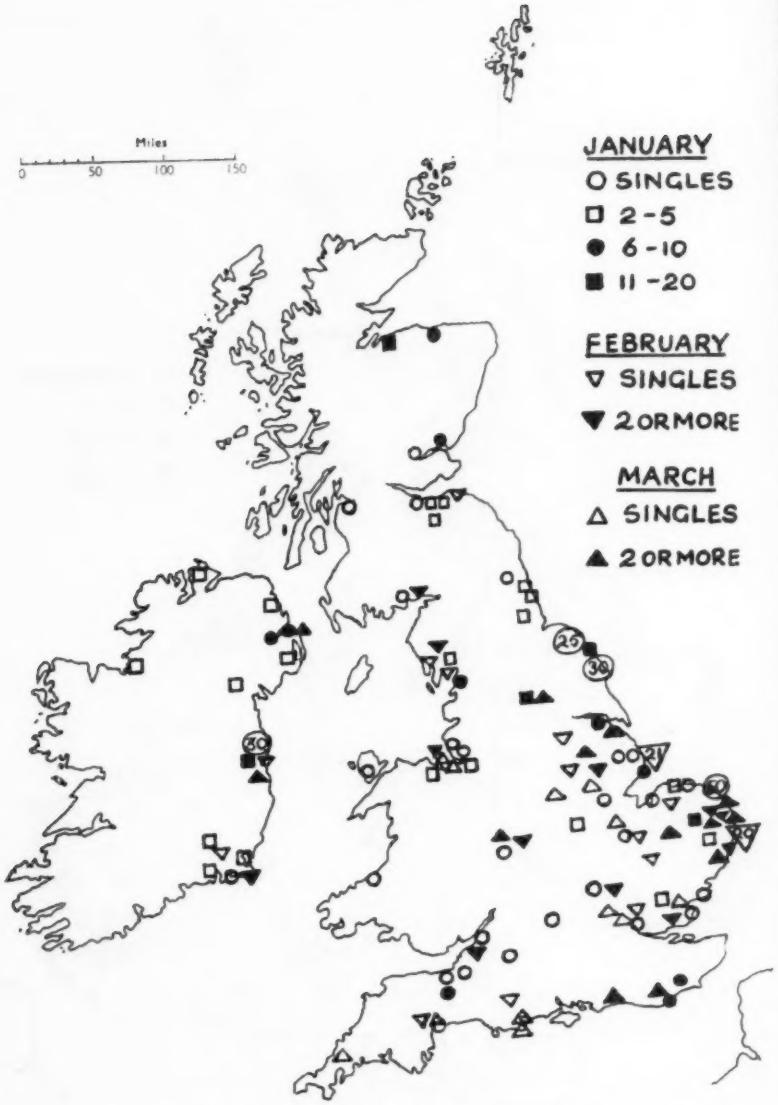


FIG. 7. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, January-March 1958

inland England and small parties were reported from the northern half of Ireland during the second half of the month (Fig. 6).

By the middle of January the numbers of Waxwings in Britain were very greatly reduced and the main east coast concentrations had broken up. That some of the birds had moved west is shown by the number of records from Ireland, particularly a sizeable concentration in the Dublin area; but they were becoming scarcer in inland England, there were virtually none left in Scotland, and the majority had, no doubt, returned to the Continent. Thereafter only scattered stragglers were reported, the majority in East Anglia (Fig. 7).

1958-59

The 1958 breeding season

In the spring of 1958 return migration was again noted inland in Sweden, especially at Kumla (nearly 100 miles west of Stockholm), and on a large scale on Gotland, between the third week in March and the end of April. Although there were a considerable number of observations of Waxwings during the breeding-season well to the south of the normal breeding range, these were fewer than in 1957 and the area of main density was much further north, beyond the Arctic Circle to the north of the head of the Gulf of Bothnia. Breeding was thus reverting to the normal range, though still above average in intensity in its more westerly parts (L. Wallin *in litt.*).

The progress of the invasion in autumn 1958

By 1958 the rowan trees had recovered their vigour and in the autumn of that year there was an abundant crop of berries in many parts of Fenno-Scandia. These berries, however, attracted large flocks of Fieldfares (*Turdus pilaris*), so that by the time the Waxwing flocks arrived in Sweden the food supply had become somewhat depleted, with the result that the birds appeared only for a short time in the eastern parts of central Sweden.

Two separate invasions appear to have occurred. The earlier and by far the larger came from the east. Early in the autumn big flocks had gathered in southern Finland and Esthonia. In the last week of October these began to move and large-scale passage was recorded on Gotland. These birds passed rapidly westwards into southern Sweden where numbers built up until by mid-November concentrations of between 2,000 and 4,000 were recorded in a number of localities. These big concentrations, it would seem, soon exhausted the berry supply and by the first week in December the numbers in southern Sweden started to drop sharply. The flocks were on the move again and this was soon demonstrated by the appearance of the birds in Britain and of at least one party in Ireland.

In mid-November a second invasion started, but it was on a smaller

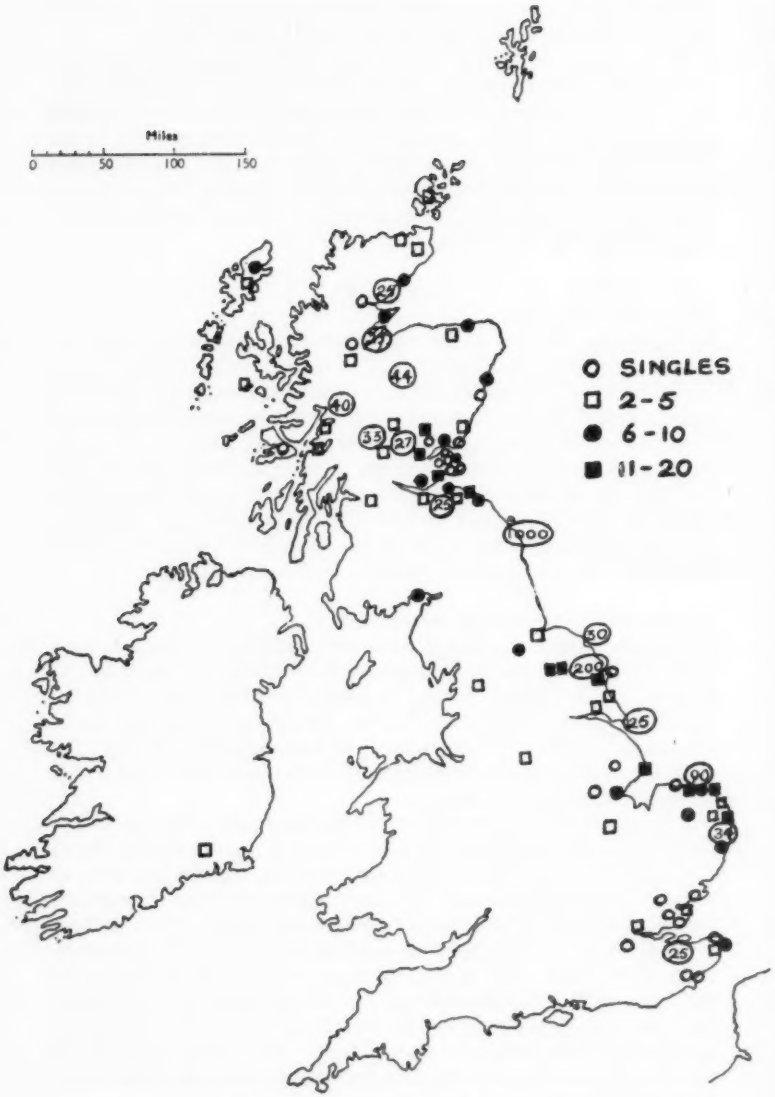


FIG. 8. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, December 1958

scale and from a different direction. Up to this time few Waxwings had been recorded in central and northern Sweden, but now concentrations of up to 200 birds appeared in these areas. The southward movement was relatively slow since, presumably, these rather modest numbers bore less hardly on the food supply. It would seem that these birds came not from the east but from the northern parts of Sweden and Finland. As they moved southward their movement was marked by small secondary peaks of numbers in southern Sweden in mid-December but, since the berry supply had been exhausted by the earlier hordes, these were short-lived and they passed on in the wake of the main body (L. Wallin *in litt.*).

There was an interesting ringing result at this time. A Waxwing that had been marked at Pegswood in Northumberland on 9th March 1957 was recovered about 15th December 1958 at Ovre Grorud in the area of Oslo, Norway (*Brit. Birds,* 52: 463).

The invasion in Britain and Ireland from December 1958 to March 1959

It is common experience that the arrival of an immigration species is often preceded by a scatter of early fore-runners of the main movement. This was true of this third successive immigration of Waxwings into Britain, the earliest bird of all being reported from Nairn on 23rd October. During November there was a small number of reports also from the Moray Firth area and from Fair Isle, one from Fife and a few from East Anglia. But the main invasion did not start until about 13th-15th December. To begin with, numbers were small, but they were scattered all down the east coast from Orkney to Kent. There was also a scattering of reports from western Scotland (Lewis, Isle of Mull, Glasgow, Skye and Glen Nevis). Similar early westerly occurrences were noted by Baxter and Rintoul (1937, 1947) for the invasions of 1921, 1937 and 1946 and were also reported in that of autumn 1957 (see above). Thereafter, numbers built up slowly, but flocks of over twenty birds were exceptional, thirty at Rannoch (Perthshire) on the 18th being the largest noted. Immediately after Christmas, however, a most spectacular immigration into north-east Northumberland was reported. Some 65-70 arrived on the 26th, and on the 27th many flocks of 30-50 (totalling at least 500) were watched coming in from the coast. For the next week every berry-bearing hedge in this area had its quota of Waxwings and there must have been at least 1,000 birds in the district. Although this was by far the biggest concentration, the same movement was also recorded further south in the East Riding of Yorkshire (25 flew south at Spurn on the 27th and there were 200 at Ayton on the 28th), on the north Norfolk coast and in east Kent. And during the following week larger parties than previously were reported from the Scottish Highlands (Fig. 8).

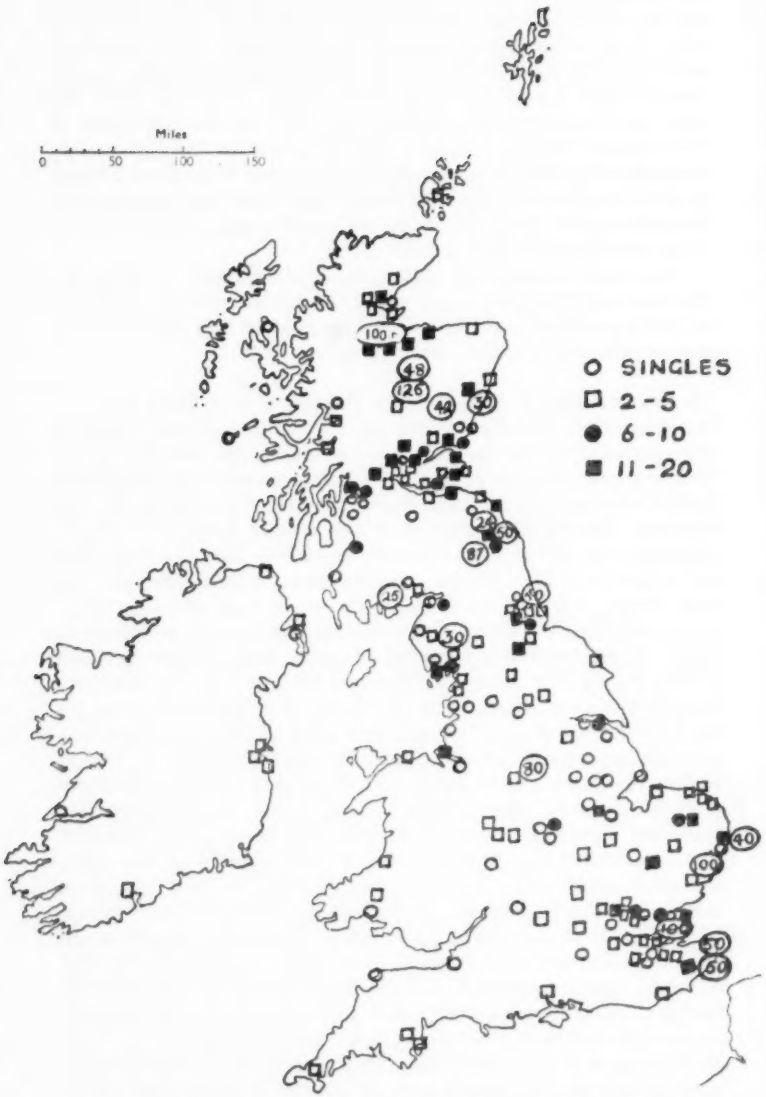


FIG. 9. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, January 1959

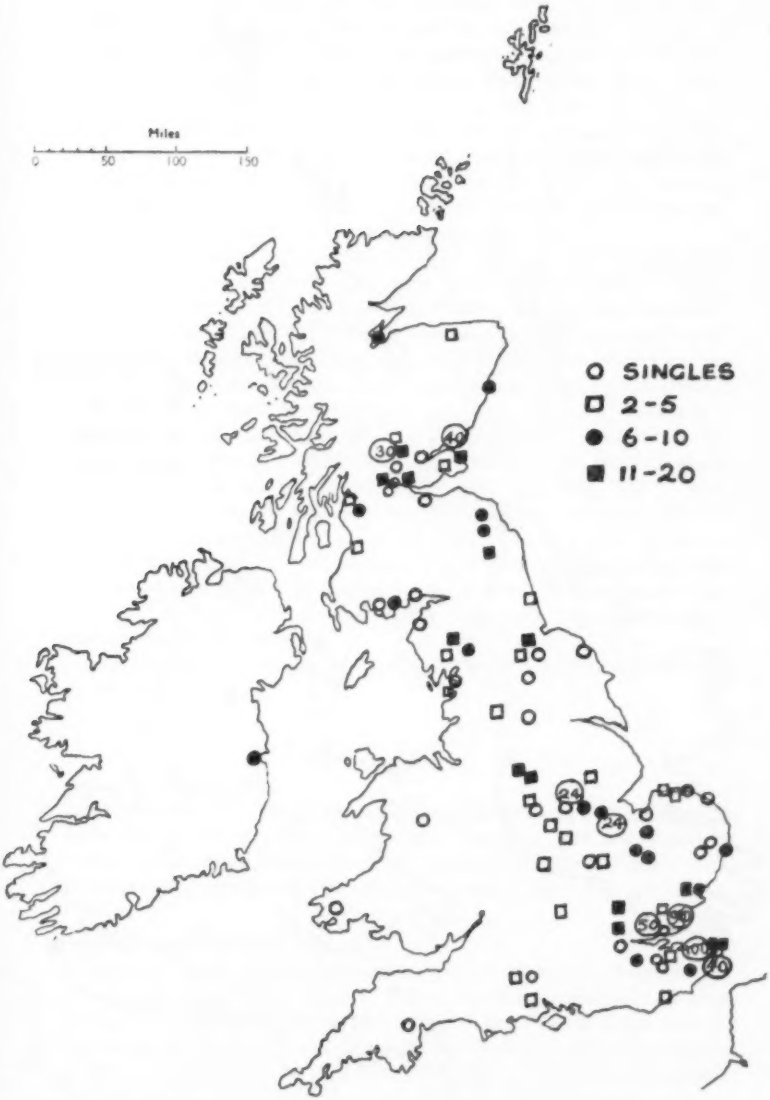


FIG. 10. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, February 1959

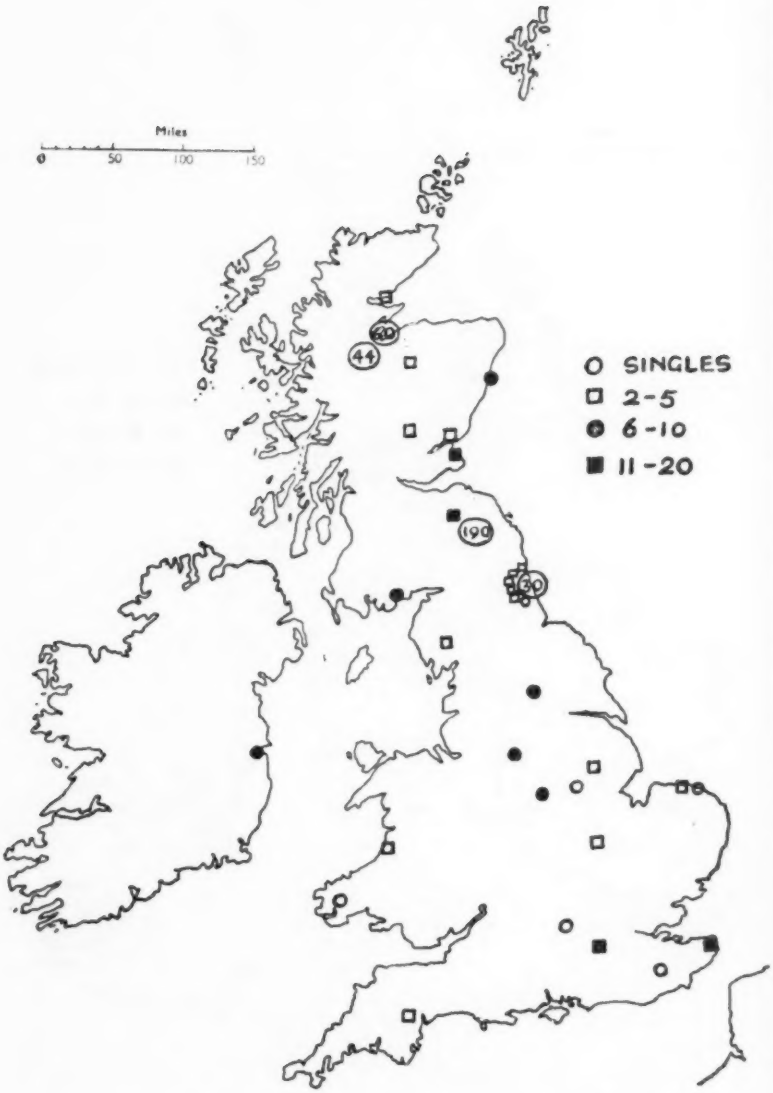


FIG. 11. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, March 1959

During January Waxwings were reported, often in flocks of considerable size, at a large number of localities over almost the whole of Scotland and England and there were smaller numbers of records from Wales and Ireland. Main concentrations were in the Moray Firth area, in the Scottish Highlands, all round the Firth of Forth, in Northumberland and in Suffolk, Essex and east Kent. The pattern of increases and decreases is so confused that it is difficult to be sure what was happening, but it seems likely that the flocks were moving about the country in search of food rather than that there were any substantial new arrivals from the Continent (Fig. 9).

During February the number of birds reported had considerably decreased although records still came from widely scattered places. The flocks were usually of smaller size. This decrease was especially marked in northern Scotland and in eastern coastal areas except around the Thames estuary (Fig. 10). This may indicate exhaustion of the berry supplies in these areas and consequent dispersal in search of food.

By March the birds had largely disappeared, although there was a small number of concentrations of considerable size, especially in the north; and in certain places (where, presumably, food was still available) some birds remained until about mid-April (Fig. 11). These late-season concentrations are interesting and may possibly indicate gathering for emigration. A notable flock of 60 at Avoch (Ross) on 1st March showed great restlessness, vigorous flight alternating with periods of gliding as they circled a field before returning to the tree they had just left. This kind of restless behaviour is certainly suggestive of a migratory impulse.

The Scottish records for the 1958-59 invasion have been summarised by Macmillan (1959).

1959-60

The 1959 breeding season

Return migration in spring was again noted in Sweden, but on a smaller scale than in the previous two years. Breeding was not noted in central or southern Scandinavia, but occurred on the north Swedish coast which is considerably beyond the normal range (L. Wallin *in litt.*).

The progress of the invasion in autumn 1959

The rowan berry crop in the autumn was rather poor in Scandinavia. Despite this fact, flocks of up to 100 or 200 Waxwings could be seen in Uppsala during the whole of October. By the end of the month, however, the food was exhausted and the birds moved on (L. Wallin *in litt.*). A bird ringed near Kalix (at the head of the Gulf of Bothnia) on 8th October was found dead at Kirkcaldy (Fife) six weeks later, on 19th November (*Brit. Birds*, 53: 511).

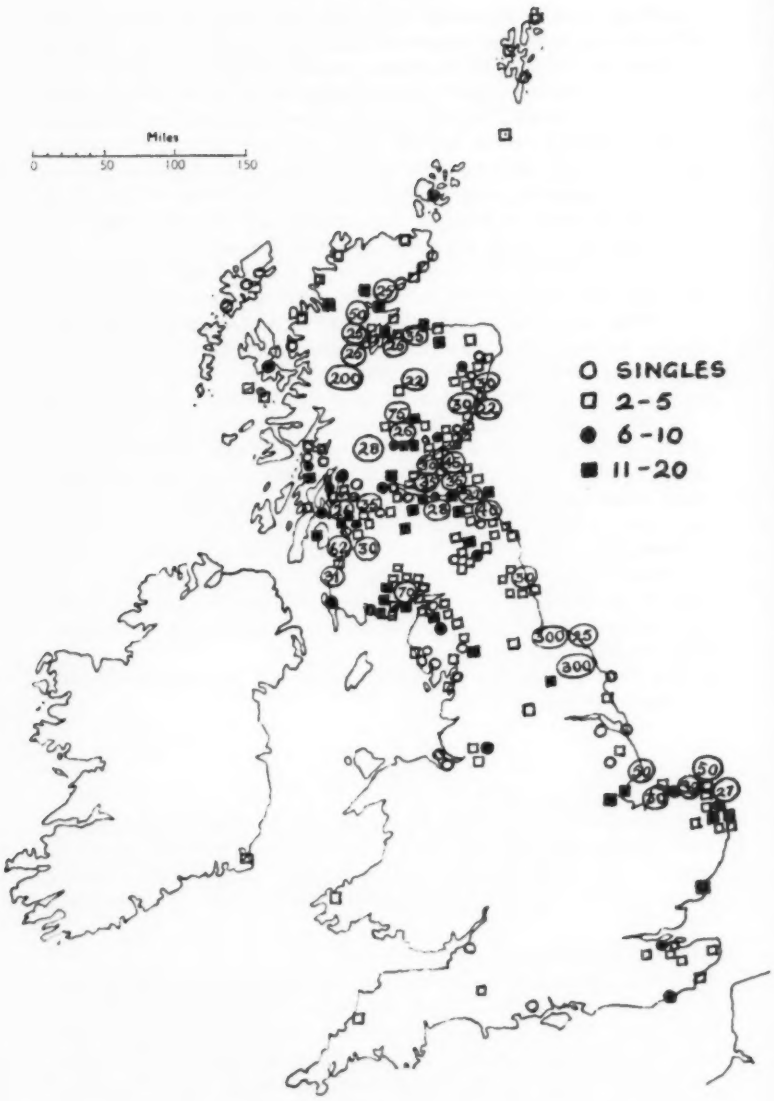


FIG. 12. Waxwings (*Bombycilla garrulus*) in Britain and Ireland, October-November 1959

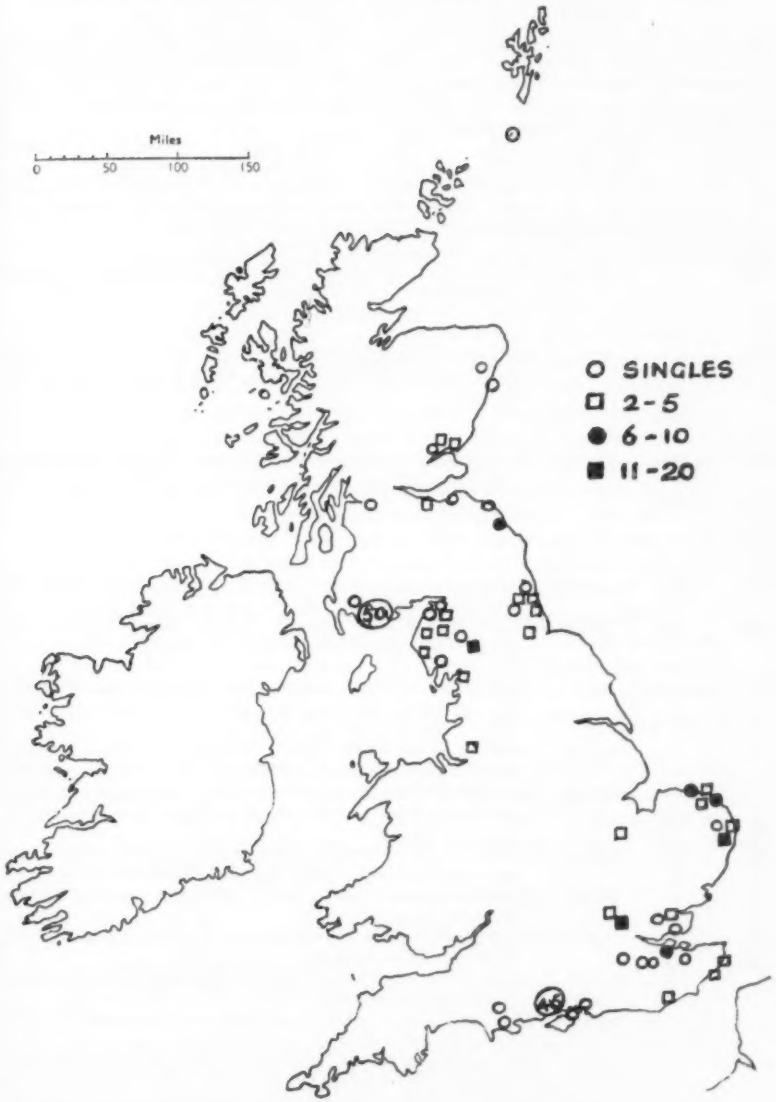


FIG. 13. Waxwings (*Bombycilla garrulus*) in Britain, December 1959-March 1960

TABLE 1—SUMMARY OF RECORDED SOUTHWARD INVASIONS OF WAXWINGS (*Bombycilla garrulus*) IN EUROPE BETWEEN 1679 AND 1960

The years up to 1900 are those listed by Fisher (1955) as ones in which there was a "southward European" invasion, and italics are used whenever Britain or Ireland are known to have been affected. The columns for Hungary and East Prussia, 1900-1940 only, are from Lack (1954).

Southward European invasions before 1900

1679-80	*1787-88*	1803	1822	*1834-35*	1854-55	1870
1685-86	1788-89	1810	*1828-29*	1841	*1863-64*	*1872-73*
1702-03	1790-91	1820	*1830-31*	*1849-50*	*1866-67*	*1892-93*

Invasions of Hungary, East Prussia and Britain and Ireland after 1900

Hungary	*Prussia*	*Britain or Ireland with notes on months and distributions*	
1903	1903	1903-04	October-December onwards; Scotland, East Anglia and notably Ireland (*BB*, 1: 148; 2: 410)
1905			
1910	(1910)		
1913	1913	1913-14	(November) December-February (April); England and Scotland, also Ireland and Wales (*BB*, 7: 263, 292, 319, 344; 8: 15, 49, 127; 9: 159)
	1918		
1920			
1921	1921	1921-22	(September) November-January (February); England, also Scotland and Wales (*BB*, 15: 155, 187, 208, 239, 269, 285, 295; 16: 114)
1923	1923		
1925			
1927			
1929			
1931	1931	1931-32	(October) November-January (March); England, also Scotland, odd ones Wales and Ireland (*BB*, 25: 223, 269, 303, 333, 347)
1932	1932	1932-33	November-December (January); mainly eastern England, also Scotland and Ireland (*BB*, 26: 259, 277, 313)
	1935		
1937	1937	1937	February-March (April); Scotland and extreme north of England, few other parts England; hard weather in Scandinavia; food scarce, many died (*BB* 31: 56, 86, 157)
		1941-42	November-December (February); Scotland and eastern England, later few other parts England (*BB*, 35: 157, 180, 231, 254, 276)
		1943-44	(October) November-January (April-May); England, also Scotland (but hundreds at Fair Isle in October) (*BB*, 37: 196, 213; 38: 34, 154, 300; 39: 94)
No records available	No records available	1946-47	(August-October) November-February (May); Scotland and England, also Wales and Ireland; largest on record (*BB*, 41: 2, 34)
		1948-49	(December) January-March (April); mainly eastern England, few Scotland (*BB*, 43: 151, 309)
		1949-50	(October) November-January (April); England, fewer Scotland, also Ireland and Wales (*BB*, 44: 158, 418)
		1957	(January) February-March (April); eastern England and Scotland, few other parts (pages 4-8)
		1957-58	November-January (March); Scotland and England, and Wales and Ireland (pages 9-13)
		1958-59	(October) December-February (April); Scotland and England, also Wales and Ireland (pages 14-19)
		1959-60	(August) October-November (April); Scotland and north and east England, odd ones other parts England and Wales (pages 20-23)

The invasion in Britain and Ireland from October 1959 to March 1960

Once again there was a small number of reports of precursors of the main invasion—a single bird in Kirkwall (Orkney) from the end of August, a number in Unst (Shetland) during September and October, a few at Pitlochry (Perthshire) from 22nd October, and reports about this time from Thurso (Caithness), Banchory and Glassel (Kincardine).

But it was not until 30th October that the main invasion began. On that and the two following days birds were recorded all down the east coast of Scotland and even in the Western Highlands, Skye, Bute and Ayrshire. At the same time records came from Northumberland, Cumberland, East Yorkshire, Lincolnshire and Norfolk. Numbers built up rapidly during the following week, but large concentrations were unusual although reports of small flocks were thickly scattered. The only really sizeable flock reported in Scotland was one of over 200 birds at Fort Augustus (Inverness) about 18th November and there were some 300 at Teesmouth by mid-November and on Carlin How (Yorkshire) on 15th November. During November there was some westward spread in northern Britain (especially from 21st November in south-west Scotland), but reports from southern and western England, Wales and Ireland were extremely scarce (Fig. 12).

As in Scandinavia, the berry crop in Britain was a poor one. The invasion was therefore much shorter-lived than in the previous three winters. By the last week in November numbers were already falling and after the end of the month records became scarce. Small numbers were still occasionally reported in January, February and March, but there were only two records of flocks of any size. These were both on 13th January when 50 were at Cardoness near Gatehouse of Fleet (Kirkcudbright) and 45 flew in from the Solent at Tichfield Haven (Hampshire). A strong hard-weather movement was taking place at this time (Williamson and Ferguson-Lees 1960).

Since some observers do not send in reports until the end of the calendar year, further records for 1960 may still come to hand. It seems improbable, however, that these will alter the general picture. The Scottish records for the 1959-60 invasion have been listed in detail by Macmillan (1960).

PART 2—DISCUSSION

The frequency of Waxwing invasions

Never before have large-scale Waxwing invasions been recorded in Britain in four successive winters. But to evaluate this properly one must consider how often invasions are recorded over the whole of the bird's range. Table 1 sets out the chief ones noted in western and southern Europe in the last three hundred years. The earlier records are doubtless very incomplete, but in the first fifty years of the twentieth

century invasions have been noted in twenty-two years. Moreover, similar invasions have been noted further east in the Balkan countries, southern Russia, Turkey and Persia. There is not sufficient evidence to show whether invasions with a westward trend are more or less frequent than those in other directions. But Lack (1954), quoting Rydzewski, cites a most interesting example of a Waxwing that was ringed in Poland in February 1937 and recovered in the following winter (when no invasion was noted in western Europe) 3,000 miles further east, in Siberia. This suggests a bird without any directional preference and the probability is that movement out of the breeding areas takes place every year in random directions on a greater or lesser scale. Britain and Ireland are on the far westward fringe of the species' range, so, of necessity, we only occasionally see a little of what is, in fact, an annual event.

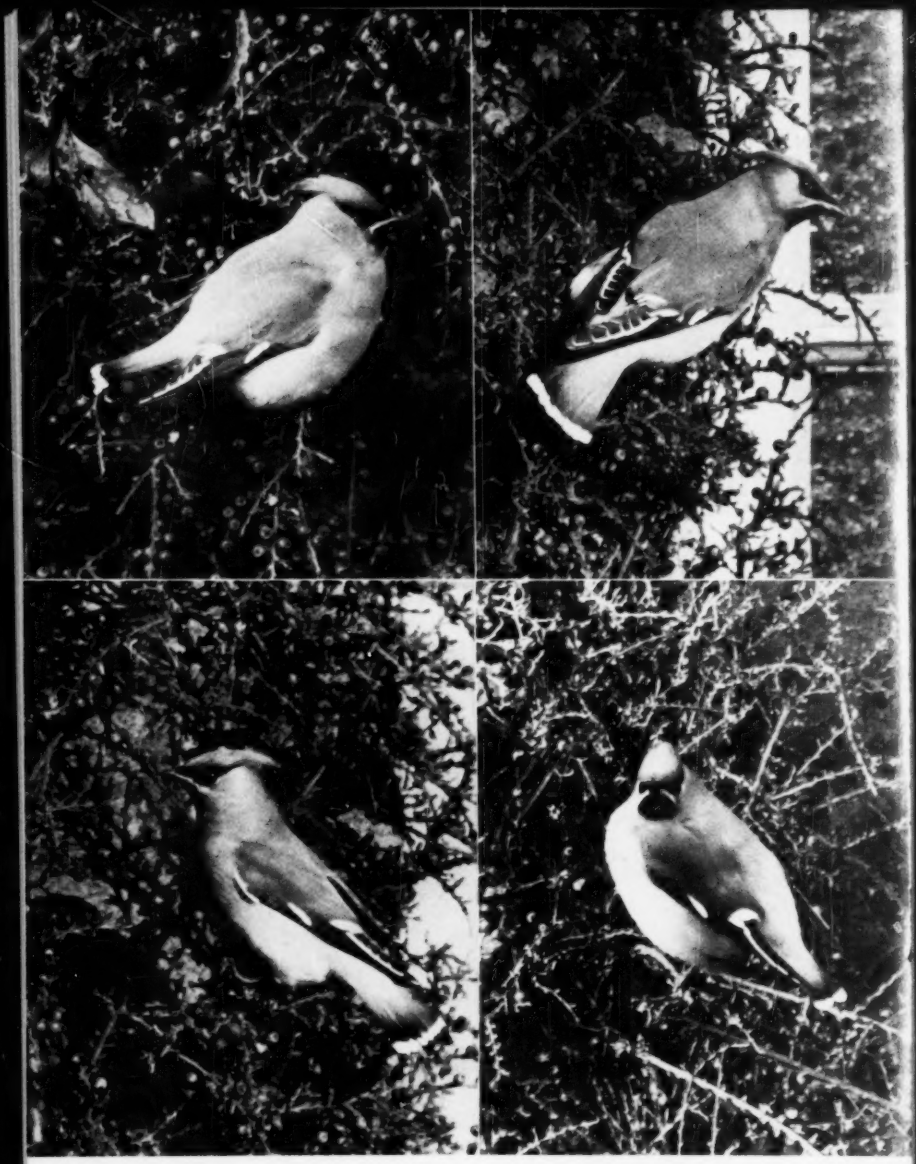
The biological function of invasion migration

If animals are to inhabit those parts of the world that have seasons during which they cannot live their normal lives, they must devise some means of passing these seasons in safety. Different animals do this in different ways. Some mammals and insects hibernate; other insects pass the danger season as eggs or pupae. But birds, with their pre-eminent powers of flight, solve this problem by flying to places where conditions are easier. In different parts of the world temperatures or lack of water may make the season inhospitable, but for most birds the problem is food. Insect-food may be absent altogether; the ground may be frozen too hard for probing bills or the water may be covered by ice; snow may have buried the seeds and low-growing berries.

The chief winter food of the Waxwing is the berries of the rowan (*Sorbus aucuparia*), an abundant tree in northern Europe where it is found both wild and lining the avenues in towns. Only when rowan berries are not available does the Waxwing turn to different foods. These are principally the berries of other trees and shrubs (frequently *Cotoneaster*, juniper, *Pyracantha*, hips and haws), but even bread, tallow, coarse oatmeal and seeds offered on bird-tables will be eaten on occasion, and whole apples may be devoured. In the spring, when the snow-cover melts, low-growing berries such as bilberry (*Vaccinium*) and crowberry (*Empetrum*) become available as important foods. Insects are taken plentifully during the breeding season.

The crop of rowan berries varies widely from year to year. This is largely due to variations in weather at the time the rowans flower, warm weather at that season causing a heavy crop. Moreover, as Svärdson (1957) has shown, a heavy crop is invariably followed by a light one because of "tiredness" in the trees. This sequence is well known to growers of tree-fruits. Svärdson has also suggested (*in*

PLATE 1. Above, Waxwing (*Bombycilla garrulus*) feeding on fallen apples, Norfolk, February 1957. Below left, resting among guelder rose berries, another main food; below right, perched by the remains of an apple 2½ inches in diameter which was eaten in four short visits (pages 39-40) (*photos: R. P. Bagnall-Oakeley*)



PLATES 2 (*above*) and 3 (*right*). Studies of a party of seven Waxwings (*Bombycilla garrulus*) feeding tamely on *Cotoneaster* berries on a roadside cottage, Norfolk, February 1957. They stripped 100 square feet of berries in only two days. Another Waxwing ate some 390 berries (roughly the equivalent of its own weight) in 2½ hours (page 40). Note the crest, black eye-patch and bib, short yellow-tipped tail and prominent white and yellow wing-markings (*photos: R. P. Bagnall-Oakeley*)

PLATE 4. Above, Waxwing (*Bombycilla garrulus*) on nest, Sweden, 1956; nests are usually in conifers and built of pine and spruce twigs, also reindeer moss and other lichens (*photo: G. Hansson*). Below, Waxwing drinking at a puddle formed by the drainage from a manure heap, Norfolk (*photo: R. P. Bagnall-Oakeley*)

PLATE 5. Female Grey-rumped Sandpiper (*Tringa brevipes*), Rybnaya River, Siberia, July 1959. Nearly Redshank-sized but with shorter legs, this species is uniform dark grey above except for light feather edges. In summer the throat and breast bear wavy bars of a similar grey, while the belly and under-tail are white (page 30). The legs and a patch at the base of the blackish bill are dull yellow. Like other *Tringa*, it perches on trees in the nesting area (*photo: A. V. Krechmar*)

PLATE 6. Above, female Grey-rumped Sandpiper (*Tringa brevipes*), showing the grey barring on the white under-parts, Rybnaya River, July 1959 (*photo: A. V. Krechmar*). Below, the only nest ever found (page 32)—four eggs in a grass-lined hollow among stones, Makus River, Siberia, 19th July 1959 (*photo: J. Y. Livshits*). Inset, a downy nestling roughly two days old (page 32) (*photo: A. V. Krechmar*)

PLATE 7. Breeding habitats of Grey-rumped Sandpipers (*Tringa brevipes*), Rybnaya River, July 1959. This species nests near the tree-line in the mountains of north-east Siberia at altitudes from under 500 to over 6,000 feet (page 31). It is characteristically found along river banks, but occasionally some distance from water in sparse forests of stunted trees (page 33) (*photos: A. V. Krechmar*)

PLATE 8. Above, pair of Grey-rumped Sandpipers (*Tringa brevipes*) brooding young, Rybnaya River, July 1959. Below, female with chick creeping under her right wing. Both sexes brood the young, but the females do so more readily. The chicks are reared among the sedges and dwarf willows of marshy river edges where they feed on the hordes of gnats and mosquitoes (page 32) (*photos: A. V. Krechmar*)

litt.) that the low-growing berries tend to fluctuate in the same cycle as the rowans so that, when the birds find a good supply of rowans, they also find a good supply of their spring food even though it is at that time hidden by the snow. They may have to move on when the rowan berries are exhausted, but know where to return to in spring. Very occasionally, as in the winter of 1932-33, the ground is sufficiently free of snow for the low-growing berries to provide food even in winter. This variation in the rowan berry crop is not, of course, necessarily uniform over the whole of the birds' range, although, since it depends largely on the weather at the time the trees flower, there tends to be an equally heavy or light crop over a wide area.

In the years under review rowan berries in northern Europe were extremely abundant in the winter of 1956-57; extremely scarce in 1957-58; moderately numerous in 1958-59; moderately scarce in 1959-60; and again exceedingly abundant in the autumn of 1960. In the winter of 1956-57 it was not until February 1957, when they had exhausted even the abundant crop in Scandinavia, that the Waxwings spilled over into Britain and the Low Countries. This invasion was largely confined to eastern Britain. In the autumn of 1957, by contrast, the Waxwings passed rapidly through Scandinavia, finding no rowan berries to detain them, and reached Britain by the first week in November, later spreading out over the whole country and even reaching Ireland. In 1958 the moderately abundant Scandinavian crop was attacked by Fieldfares before the Waxwings arrived, so that by late December it had failed and the birds moved on to Britain, again spreading over the country and extending to Ireland. In 1959 the pattern of 1957 was repeated, berries again being scarce in Scandinavia, and the birds reached Britain early—from 30th October onwards. The British berry crop, however, was not very abundant in this year and could not support many birds after the end of November. On the score of the very abundant crop in the autumn of 1960, G. Svärdson (*in litt.*) has predicted scarcity of food supply in the autumn of 1961 and consequent large-scale emigration from Scandinavia. It will be interesting to see whether this forecast proves to be as accurate as the similar one he based on the expected scarcity of 1957 (Svärdson 1957).

Complementary to the rowan berries in determining the pressure on the food supply is, of course, the level of the Waxwing population. As already stated, a heavy berry crop is primarily caused by warm weather at the time the rowans flower. This good weather is also conducive to a high survival rate among young Waxwings during the breeding season and the subsequent heavy crop of berries also helps above-average survival among the birds during the following winter. In this way the population-level builds up rather rapidly. Since, however, a poor berry crop invariably follows a heavy one, it is in

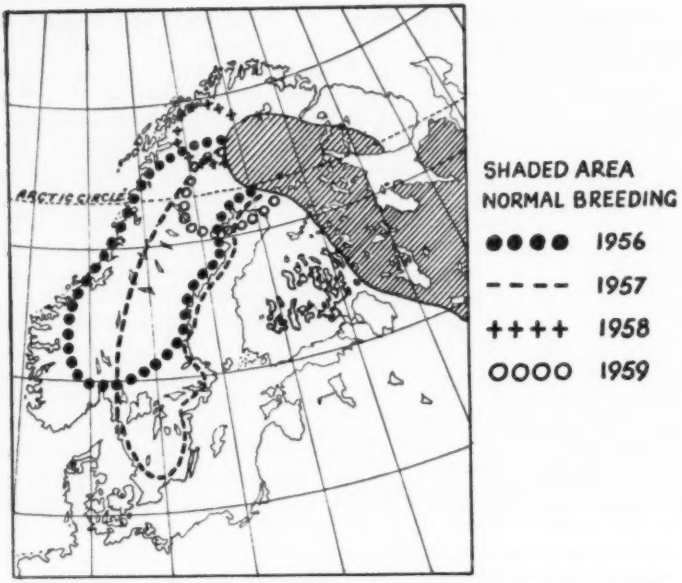


FIG. 14. Extensions of the breeding range of the Waxwing (*Bombycilla garrulus*) in Fenno-Scandia in 1956, 1957, 1958 and 1959

the autumn following a heavy crop that the peak pressure on food supply occurs. Population is high; berries are scarce; the birds must move or starve. In some winters, indeed, they fail to find food and do starve in large numbers, as was noted by Baxter and Rintoul (1937) when many died on reaching Britain in February and March 1937, following severe weather in Scandinavia. When this happens, the population may decline as sharply as it rose previously and it is interesting to note (see Table 1) that following the 1937 winter no further invasion was recorded in western Europe until 1941-42. It seems possible that the poor berry crop in the 1959-60 winter may have caused a similar heavy mortality and it may be that this will bring the present series of invasions to an end.

When the population is at a high level there is usually an extension of breeding beyond the normal range. This may be caused by an overflow in spring, the birds moving out at that season from the overcrowded breeding areas. Or, more commonly, some of them stay behind in the wintering areas and nest there. It has proved impossible to obtain direct evidence of the level of population in the main breeding areas during the years under review, but the extent of the breeding

range gives a strong indication that the level remained high throughout the four years (see Fig. 14). In the spring of 1956 there was evidence that an overflow of breeding birds into the Scandinavian peninsula took place. In 1957 many Waxwings from the great flocks of the previous winter remained behind to nest over almost the whole of Sweden. In 1958, following the poor berry crop, extra-limital breeding was reduced but nevertheless above average, the main centre being to the north of the Arctic Circle. In 1959 the limit of the breeding range had retreated still further, but nesting in the north Swedish coastal areas was still beyond the normal area. This continued high level of population is, indeed, the probable explanation of the unprecedented series of four large-scale invasions of Britain which, being on the extreme western edge of the birds' range, are invaded only when pressure on the food supply in Europe is very great.

G. Svärdson (*in litt.*) states that study of the Swedish nesting records (which are, of course, beyond the normal breeding range) shows that they tend to occur in short sequences of two or three years and that the first of these years tends to be the richest. This conforms fairly well with the events of 1956-59 except that in these years the sequence was unusually prolonged and the peak year was the second one, 1957, following the big invasion in the year of abundance. Probably the extension in range in 1956 by overflow in the spring was unusual.

To sum up, the Waxwing depends mainly on a winter food of which the supply varies widely in different years. True migration—the annual movement from a breeding area which is inhospitable at some season to a kinder area—is an adaptation to a variation in conditions, usually food supply, that occurs annually. Sedentary habits are an adaptation to conditions that are reasonably stable throughout the year. The invasion type of migration is an adaptation to conditions that fluctuate not annually but irregularly.

The proximal causes of the invasion type of migration

Lack (1954) has suggested that the hypothesis which best fits the known facts of invasions is that big emigrations are stimulated proximally by high numbers as such, crowding producing unusual restlessness and excitement culminating in emigration in advance of failure of the food supply. This, he suggests, is a useful adaptation resulting in early dispersal before the high population exhausts the food supply and allowing the birds to set out before they become weakened by starvation. In seasons when population is at a lower level this stimulation is absent and emigration is a direct response to failing food supply. Svärdson (1957) has been somewhat critical of this view, suggesting that the proximate factors that stimulate invasion migration are just the same as those that stimulate true migration and that the birds

start to move every autumn, the difference between the two types of migrants coming when they encounter abundant food, invasion migration then being inhibited and true migration unaffected. To the present author these views do not seem to be irreconcilable. It seems reasonable to suppose that Svärdson is right and the internal physiological state of the birds and the immediate environmental conditions that cause the onset of true migration also operate for invasion migrants and, moreover, operate regardless of population level. But Lack may equally be right that, when population level is high, an additional proximal factor operates leading to early reinforcement of the migratory urge. In each of the years under review movements of Waxwings were recorded rather early in the season. As has been shown, there are indications that population was at a high level throughout these years, and this earliness tends to support Lack's view. In some species the big emigrations have been shown to be composed mainly of young birds. This has been found to be less true of Waxwings than of some other birds and in 1956-59 there is no evidence of an unusual proportion of young birds.

It seems that in many species of birds migration is a somewhat unstable form of behaviour. Lack (1944) in discussing the problem of partial migration has shown the delicate balance of genetic, internal physiological and external environmental factors that governs it. Nice (1937) has shown that the American Song Sparrow (*Melospiza melodia*), a partially migratory species, does not inherit migratory behaviour and individuals may migrate and remain sedentary in successive winters. Cramp, Pettet and Sharrock (1960) have associated the 1957 irruption of tits (*Parus* spp.), which do not normally show invasion migration behaviour, with high population following an unusually good survival rate during the preceding mild winter; and they have cited evidence of excitement in the birds, which may have been one factor in their readiness to enter homes and attack paper, etc. The summer of 1959 was unusually fine and dry in Britain. As Williamson and Spencer (1960) have shown, in the autumn of that year there were quite unusual numbers of foreign recoveries of British-bred Linnets (*Carduelis cannabina*) and Goldfinches (*C. carduelis*). Dry weather during the critical weeks from egg-laying to the free-flying stage is likely to lead to above-average survival of the young and so to a high level of population. It is tempting to suggest that here is an example of invasion behaviour occurring quite suddenly in two species with which it is not usually associated and in response to an unusually high level of population. In the autumn of 1959, too, irruptions of tits were again noted in Britain probably as a result of similar breeding success in the fine summer (S. Cramp *in litt.*).

There seems to be an almost infinite range of variability between the fully migratory species and those that show this form of behaviour

only very occasionally and in response to an unusual situation. Perhaps, however, it is not really so surprising that migrational behaviour of one sort or another should be more or less latent in birds, since their powers of flight must provide the most obvious solution to their food supply problems.

ACKNOWLEDGEMENTS

The great majority of the British and Irish records on which this survey is based have already appeared in regional bird reports and acknowledgement has been made there to the host of observers concerned. The author wishes to express his gratitude to all those who so contributed and in particular to the editors of local reports without whose work this paper could hardly have been prepared and who have so tirelessly and courteously answered his enquiries. To George Waterston and Andrew Macmillan he is especially grateful for their analyses of the Scottish records that they generously allowed him to use. To Göran Hansson and Lars Wallin he extends especial thanks; without their permission to draw unreservedly on their work and their kindness in answering his enquiries it would have been impossible to attempt to relate the course of the invasions in Britain to the main Continental developments. To Dr. Gunnar Svärdson he is most grateful not only for his invaluable paper on "The 'invasion' type of bird migration" (which should be read as a background to the present study) but also for information and comments on the series of invasions under review.

SUMMARY

(1) The invasions of Waxwings (*Bombycilla garrulus*) during the winters of 1956-57, 1957-58, 1958-59 and 1959-60 are described with special reference to the breeding season preceding each, their progress in Scandinavia and events in Britain and Ireland.

(2) The frequency of Waxwing invasions into western and southern Europe is considered.

(3) The biological function of invasion migration as an adaptation to irregularity in food supply is discussed. Variations in the crop of the berries of the rowan (*Sorbus aucuparia*) and their effect on the level of population and on the timing and extent of movements and breeding in the years under review are described.

(4) The proximal causes of the invasion type of migration are discussed, in particular the importance of high numbers as such.

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Studies of less familiar birds

110. Grey-rumped Sandpiper

By Irene Neufeldt, A. V. Krechmar and A. I. Ivanov
Photographs by A. V. Krechmar and J. Y. Livshits

(Plates 5-8)

VERY LITTLE IS KNOWN about the breeding biology of the Grey-rumped Sandpiper (*Tringa brevipes*)* because it inhabits the remotest and wildest mountains of north-eastern Siberia. During the last few years, however, observations have been made by A.V.K., V. I. Kapitonov, K. A. Vorobiev and A. P. Vaskovski, and the following account is based mainly on these. All references to Kamchatka, the Sea of Okhotsk and the Cherski range respectively concern the papers by Averin (1948), Vaskovski (1956) and Vorobiev (1959).

This wader is widely distributed in the mountains of north-eastern Siberia from the Putorana mountain plateau (Lake Keta, the Rybnaya and Khantaika Rivers, etc., at about 69°N, 90°E) in the west to the mountains of the Kamchatka peninsula and probably the Anadyr range in the east. Within these limits Grey-rumped Sandpipers have

*In *The Handbook* this bird is treated as a race of the Wandering Tattler (*Tringa incana*) of America and the two forms are still regarded as conspecific by N. A. Gladkov in *The Birds of the Soviet Union* (1951). However, as pointed out in *The Handbook*, many other authors have treated the two as separate species because of structural differences, the Wandering Tattler having a longer nasal groove and the backs of the tarsi scutellated instead of reticulated; in addition, its under tail-coverts are barred in summer like the breast, instead of uniformly white as in the

been found in a number of places—in the Kharaulakh mountains, east of the Lena River at about 69°-70°N, in the Verkhoyanski range near the source of the Yana and Adycha Rivers, in the Cherski range by the upper courses of the Indigirka River and, lastly, in the mountains along the watershed between the Kolyma River and the Sea of Okhotsk. There is nothing new that can be said about the southern limits of the breeding range and, as far as we know, the species nests south to the high mountains near Lake Baikal and in the south-eastern parts of the Sayan mountains near Lake Kosogol.

The vertical distribution of the Grey-rumped Sandpiper varies in accordance with the latitude. In the foot-hills of the Putorana mountain plateau, where the tree-line is rather low, A.V.K. met these birds from only 100 to 300 metres (about 325-1,000 feet) above sea level; and in the Kharaulakh mountains, also in the far north, V. I. Kapitonov found them at similar altitudes, from 200 to 600 metres (roughly 650-2,000 feet). On the other hand, according to Vorobiev (1959), the species is common in the Cherski range from 800 to 1,400 metres (roughly 2,600-4,600 feet) above sea level and to the north of Lake Baikal Stegmann (1936) recorded it from 1,500 to 1,800 metres (roughly 5,000-6,000 feet). It is now evident that the Grey-rumped Sandpiper is characteristically found along the banks of rivers and streams in subalpine and alpine zones, and that only a few pairs nest much below the tree line.

The main migration routes are along the eastern coasts of the Asiatic continent and only as rarities have Grey-rumped Sandpipers been recorded on passage in central parts of Siberia. The first spring arrivals appeared on the Kamchatka coast about 13th-15th May. On the shores of the Sea of Okhotsk, near Magodan, the main passage took place between 20th and 25th May, and in 12-15 days the spring migration was over there. Much further west, in the Kharaulakh mountains, the first Grey-rumped Sandpipers were recorded on 23rd May at a time when all the mountain streams were still covered with ice and there were only a very few spots free of snow where the birds could feed, but in three or four days enough of the snow and ice had melted for them to find feeding places on the river banks. In the Cherski range the first of these waders appeared on 31st May. It was the very beginning of spring in the mountains and the northern slopes were covered with snow while the river beds were still waterless, as in

present bird (plates 5 and 6a). In accordance with our normal practice, we are following the *Check-list of the Birds of Great Britain and Ireland* (1952) in treating them as distinct species. The information given in *The Handbook* on the breeding of the Grey-rumped Sandpiper (or Polynesian Tattler) is based entirely on observations on the Wandering Tattler and so the data given in this text supplement that, while it should be particularly noted that the nest shown on plate 6b is the only one of the Grey-rumped Sandpiper that has ever been found.—I. J. F. L.

winter. Then in a day the weather became much warmer, a lot more snow melted and the waders had a chance to search for food beside the now-flowing streams.

At the westernmost point of the range in the western foot-hills of the Putorana mountain plateau A.V.K. recorded the spring arrival on 31st May in 1958 and on 1st June in 1959. In each year there were only odd birds and a few pairs or small parties of three or four at first, but in about four days they became abundant. At first they kept to the very edge of the ice on the Rybnaya River because the thaw starts earlier there than on other rivers in that area. They searched for their food among the debris on the melting snow and ice, picking up the first spring insects (Apterygota) which were very easy to see on the white background. From the day of arrival the birds were beginning to display. Both their displays and their calls were very reminiscent of those of the Greenshank (*T. nebularia*) and like that species they often perched on dead branches (plate 5). Until about 20th June pairs could be seen every day at the same places, usually at the mouths of small tributaries of the Rybnaya River and along the Makus and Kamustyak Rivers (plate 7). After this date only solitary males were noted and it was presumed that the females were busy with incubation, but until mid-July A.V.K. found neither eggs nor young, nor did he see any pairs alarming. On 19th July 1959, however, the geologist J. Y. Livshits happened across the only nest of this bird that has ever been found (plate 6b). It was simply a hollow among stones lined with dead grasses and there were four eggs. The incubating female was very tame and the observer was able to approach to within the distance of his outstretched arm. The habitat was stony forest-tundra 320 metres (roughly 1,050 feet) above sea level near the source of the Makus River and approximately 80 kilometres WSW of Norilsk.

On 16th July, at the mouth of a small tributary of the Rybnaya River and about 100 metres above sea level, A.V.K. discovered his first brood of downy young; there were four of them and they were only one or two days old (one is shown in the inset on plate 6b). They were very lively and running about among sedge and willow scrub on the marshy ground beside the river. The mosquitoes were swarming in countless millions at that time and the chicks, like the adults, were picking them up from the grass and even catching them in the air. Only the female accompanied this brood; with loud notes of alarm she perched on top of a tree near-by (plate 6a) or, approaching very close to the intruder, tried to lead him away from her brood. Plate 8b shows the female brooding the young (one is just creeping under her right wing) after crouching with half-stretched wings and recalling her scattered brood with a sweet trill. On 18th July A.V.K. found four pairs of Grey-rumped Sandpipers alarming along a two-

kilometre stretch of the river and located two more broods of recently hatched nestlings among the willow scrub. In each case both parents were with the young and both brooded them (plate 8a), though the females did so more readily. On the next day in a similar habitat three older chicks were discovered and on the 25th he found another brood, this time accompanied only by the male, on the partly dry shingle bed of a mountain stream on the watershed of Lakes Keta and Khantaiskoe. On 31st July, by the Khantaika River, he found a young one that was still only a few days old, but a week later, on 7th and 9th August, he came across young that were able to fly quite well and between the 12th and 19th the numbers of Grey-rumped Sandpipers—the young already very much like the adults—noticeably diminished until the last small flock was recorded on 8th September.

There are a few additional data on breeding from other parts of the range. V. I. Kapitonov found a single chick accompanied by only one adult on 19th July above the tree-line in the Kharaulakh mountains. According to K. A. Vorobiev, Grey-rumped Sandpipers are common on the stony banks and islets of the mountain streams along the upper courses of the Indigirka River (the Olchan and Omuk-Kiuriuelyakh Rivers). Habitats are rather diverse there, but the birds kept mainly to islands overgrown with polar willow scrub, bilberry and dwarf birches interspersed with open spaces covered with mosses and lichens and sometimes dotted with stones. However, broods were also found rather far from rivers in thin forests of stunted larch where numerous dead trees were lying on the ground and thickets of low bushes alternated with open spaces. The first brood to be recorded by Vorobiev was found as early as 5th July; and he noted that each one was accompanied only by the male, which had no brood patches.

The last Grey-rumped Sandpipers on autumn passage on the north-western coast of the Sea of Okhotsk were observed during 17th-19th September, but in Kamchatka the last of the autumn was seen as late as 4th October. The species is known to winter mainly from the Malay Peninsula to north-western Australia and Queensland and so it is particularly interesting to note that odd Grey-rumped Sandpipers have been recorded in the winter months near hot springs in Kamchatka: this is three or four thousand miles further north than the normal winter range and on the same latitude as Britain.

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Foot-movements in plovers and other birds

By K. E. L. Simmons

WADERS SHOW many striking adaptations in behaviour and structure which enable them to obtain their food. In particular, several types of foot-movements have been evolved and this short paper sketches, informally, something of what is known about these, with special reference to the activities of plovers. There is much scope for study of the various feeding movements of waders; especially, we need more information on the precise function of individual movements.

FOOT-MOVEMENTS IN PLOVERS

"*Foot-trembling*"

This behaviour has been recorded in at least four species of plover, being especially well known in the Lapwing (*Vanellus vanellus*) (see, for example, Portielje 1922 and Spencer 1953). Contrary to the impression given in the editorial comment to Coleman (1960), "foot-trembling" (or "foot-tapping" or "foot-pattering") when feeding is well known in the Little Ringed Plover (*Charadrius dubius*), having been recorded as long ago as 1915 by Heinroth. I have myself quite recently reported (Simmons 1953b) that this species shares with the Lapwing and the gulls (*Larus* spp.), among others, "one curious habit apparently connected with food-seeking—that of making pattering movements of the feet on mud. In the two plovers this is a trembling action of one foot only while the gulls mark time with both feet." Sluiters (1938) also referred to this behaviour in the Little Ringed Plover, calling the trembling action "leg-shaking" (after Heinroth and Heinroth 1928) and noting that, when trembled, the foot may be lifted up to half an inch above the ground. Sluiters remarked also that, while a somewhat similar habit had been recorded in the Ringed Plover (*Ch. hiaticula*) and in the Kentish Plover (*Ch. alexandrinus*) by Verwey (1926), he himself had never seen obvious foot-trembling in Ringed Plovers though these birds did make some sort of one-leg movement while standing still and before seizing prey. In fact, however, Verwey was referring to the quite definite records of Astley (1923) for the Ringed Plover ("very rapid vibration of one foot on the wet sand") and of Medlicott (1923) for the Kentish Plover (bird stops after a run, taps and "always seems to obtain a morsel"). The Heinroths (1928) observed foot-trembling only in the Lapwing and Little Ringed Plover (captive individuals of which would even perform on hard surfaces, such as linoleum and wooden floors), and their Ringed and Kentish Plovers were not seen to perform any comparable foot-movements. There seems little doubt, however, that these species do foot-tremble (see above and, also, Tucker 1940).

Other foot-movements

The relationship between the one-legged foot-trembling and the various two-legged movements of the Little Ringed Plover and related species also needs to be examined. Most (probably all) plovers use two-footed movements in forming the nest-scrape and in egg-uncovering ("scraping"), and also in the pre-copulatory display ("marking-time"), the latter activity perhaps being rarer in the Kentish Plover (J. Walters *in litt.*). A few species, notably Kittlitz's Sandplover (*Ch. pecuarius*), also cover the eggs with sand on leaving the nest, using special leg-movements (see, particularly, Hall 1958).

When scraping, the male Little Ringed Plover (for example) forms or enlarges a hollow "by leaning forward and rotating on his breast, body and tail slanting up, feet scratching backwards" (Simmons 1953b). The same scraping movements are done by both sexes of the Little Ringed and Kentish Plovers when retrieving buried eggs, though they usually probe with the bill first (Walters 1956). The relation between these scraping movements and those used by Kittlitz's and other plovers in hiding the eggs is less clear. Superficially they seem to be similar but the egg-covering ones have a sideways orientation apparently lacking in normal scraping and there are other differences (see Hall 1960). The marking-time actions are quite distinct from foot-trembling and from the various scraping movements. When marking-time, the male Little Ringed Plover (for example) approaches the female, his footsteps getting "progressively shorter and shorter, and higher and higher until, when he stands over her . . . he is 'marking-time' vigorously on the spot, sometimes with such exaggeration that he may actually strike his breast with the alternately raised feet" (Simmons 1953a).

There have been attempts to equate foot-trembling with some or all of these two-legged movements (e.g. Tucker 1940, Armstrong 1950, Milon 1951), but these seem ill-advised. Armstrong and others have suggested that marking-time derives from foot-trembling, "entering" courtship as a displacement-activity. There has obviously been confusion here with the superficially similar foot-paddling of gulls (as there was also, in a different context, in Simmons 1950). I put forward an alternative explanation (Simmons 1953a), namely that marking-time was "more likely an inhibited locomotory movement". It may be added that such behaviour is now ritualised and that it is equally likely that, instead of being derived from inhibited approach movements, marking-time is based on inhibited mounting movements.

FOOT-MOVEMENTS IN OTHER BIRDS WHEN FEEDING

As indicated by Portielje (1922) and Verwey (1926), foot-trembling seems confined to the true plovers. Portielje did not observe it in other wader species watched by him, including the Ruff (*Philomachus*

pugnax), Black-tailed Godwit (*Limosa limosa*), Redshank (*Tringa totanus*) and Curlew (*Numenius arquata*). However, some other movements have been recorded and may be mentioned briefly.

"Foot-paddling" and "jumping"

"Foot-paddling" (or "foot-trampling" or, when done in water, "puddling") is apparently common in scolapacine waders. The Woodcock (*Scolopax rusticola*) tramples before probing (Heinroth, quoted by Tucker 1940; Portielje, quoted by Tinbergen 1953). The Dunlin (*Calidris alpina*), together with its allies, "will sometimes patter on the mud or sand with its feet or jump up with both feet together" (Tucker 1940), similar "jumping and dancing" on the sand being mentioned by Ticehurst (1923). The Redshank, also, will "jump" up and down on the mud when feeding (Tucker 1940). Recently, Meyerriecks (1959) described a Semipalmated Sandpiper (*Calidris pusilla*) seen foot-paddling in a small pool formed by the incoming tide. It alternately lifted and depressed its legs very rapidly for about ten seconds before peering at the surface and then stabbing (not probing) rapidly with its bill, making brief swallowing movements afterwards.

Two-footed paddling is also very well known in gulls (see Portielje 1928 and Tinbergen 1953; also, for example, Colthrup 1923, Savage 1923 and Robinson 1923). It also occurs in the ducks, geese and swans, in the flamingos and in the herons.

Other movements

The "pirouetting" of phalaropes (*Phalaropus* spp.), chiefly in shallow water, is too well known to require further description (see Tinbergen 1935, 1953, Tucker 1940) but the "rushing" behaviour in shallow water of certain other scolapacine waders, e.g. Green Sandpiper (*Tringa ochropus*) and Greenshank (*T. nebularia*), has been much less fully documented. Greenshanks have been seen running about quite fast with high steps, sharply and abruptly changing direction, before settling down to quiet, normal feeding (Simmons 1951). While an element of fear could be involved in such behaviour, it seems more likely that such movements help in uncovering prey (see below).

THE FUNCTION OF FOOT-TREMBLING AND OTHER FEEDING MOVEMENTS

Worms

Burrow-haunting, segmented worms (Annelida) figure frequently in the diet of many waders and gulls, and the foot-trembling of plovers and the analogous paddling and jumping of other birds are widely supposed to have reference to worms as prey (see titles in the list of references; also, for example, comments in Tucker 1940). Both

Portielje (1922) and Spencer (1953) stressed this in the case of the Lapwing (Portielje mentioning earthworms of the genera *Lumbricus* and *Allolobophora*), while Sluiters (1938) described foot-trembling in the Little Ringed Plover under the heading "worm-drilling". It is clear, however, especially from the discussion in Tinbergen (1953), that this particular interpretation of the function of foot-trembling and paddling is far from settled. These movements are said to exploit the innate escape reaction of the earthworm to soil disturbance caused by the Mole (*Talpa europaea*) but, as Tinbergen points out, only a few species of worm have this reaction. On land, especially in fields (where Lapwings and gulls feed to a large extent), terrestrial earthworms (Oligochaeta) are the main prey and, of these, *Lumbricus* has not got the response to the Mole, whereas *Allolobophora* has. Yet the former apparently figures more frequently in the diet of the birds concerned than does the latter. On the sand and mud of the shore, marine bristle-worms (*Nereis*) and lugworms (*Arenicola*), both polychete worms (Polychaeta), are frequently eaten by birds, yet neither has any reaction to the Mole. As it seems likely, however, that worms are exposed in some way by the various foot-movements (how anecdotal much of the evidence is, is not clear), obviously other phenomena besides a response to the Mole must be involved, including some sort of reaction to vibration from above. Spencer (1953) suggested that the worms may react to the birds' leg-movements as they do to the patter of rain, while Portielje (1928) mentioned that Herring Gulls (*Larus argentatus*) are especially likely to paddle on grass after rain. Earthworms are known to lie nearer the mouths of their burrows in wet weather and thousands appear on the surface after heavy rain. The precise connection (if any) between the effect of rain and of pattering (etc.) on the behaviour of earthworms remains to be investigated. It may well be that the various foot-movements have reference to a wider range of prey and may be of only incidental value in capturing worms (see below).

Other prey

The suggestions which follow all have much to recommend them. Sluiters (1938) thought that the behaviour of Little Ringed Plovers (which are not great worm eaters, apparently) and Lapwings caused "insects" (presumably quite a variety of invertebrates) that were hidden beyond the range of the birds' short bills to come nearer the surface (though the mechanism of this response goes unexplained). In the editorial comment to Coleman's note (1960), it was thought possible that the "more common function of both tapping and paddling is to cause minute organisms to move and thus show themselves". Spencer (1953) also suggested that the pattering of the Lapwing, besides raising worms, "may dislodge other organisms,

bringing them into the Lapwing's view". Pirouetting, rushing and puddling in water all probably function both to whirr up organisms from the bottom or suspended in the water, or to make these move and show themselves (Tinbergen 1935, 1953, Tucker 1940, Simmons 1951).

It may well be, too, that in causing worms of all types merely to move, and thus reveal themselves or the site of their burrows, the pattering and other movements fulfil their function and that one need not seek more complicated answers.

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Notes

Little Shearwater in Norfolk.—On 1st May 1960 we found a freshly dead shearwater on the beach between Cley and Blakeney Point, Norfolk. It was in good condition but for the left carpal joint, which was bare to the bone. The bird was black above and white below, the white extending above the eye; it seemed small and its under tail-coverts were white. These facts made us think that it might be a Little Shearwater of the Madeiran race (*Procellaria b. baroli*) and this was confirmed on our return home when we noted the following characters:

> Total length 11¼ inches. Bill 25 mm., wing 178 mm., tarsus 38 mm., middle toe with claw 43½ mm., tail 71 mm. Crown, back and tail black; tips of greater wing-coverts grey. Under-parts white, this colour including the under tail-coverts and also extending to a band over the eye; junction of white and black on neck mottled. Bill blue-black; outer toe black; inner toes, webs and tarsus blue-grey.

The corpse was kept in the deep-freeze in the Department of Chemical Engineering at Cambridge and then forwarded to the British Museum (Natural History) in London on 4th May. Our identification was confirmed and the specimen is now preserved there.

C. J. R. THORNE and R. M. NEDDERMAN

[Only six previous records of this species in Britain and Ireland are now accepted and one of those was similarly picked up dead at Blakeney Point on 11th May 1929. All refer to the same race, which nests in the Azores, Salvages, Madeira group and Canaries.—EDS.]

Waxwings feeding on apples and their rate of berry consumption. On 16th February 1957 two parties of seven and nine Waxwings (*Bombycilla garrulus*) appeared at Holt, Norfolk, where they fed intermittently on the berries of *Cotoneaster* and guelder rose (*Viburnum opulus*), and also on apples. The last-mentioned were mainly lying on the ground beneath the trees of an abandoned orchard, though a few still hung on the branches. The birds used the apple trees as a half-way resting stage between their two main sources of berries, but

for two or three days ignored the apples themselves. Blackbirds (*Turdus merula*) and Starlings (*Sturnus vulgaris*) were, however, feeding on them while the Waxwings were resting in the trees and this probably attracted the attention of the latter to the fruit. (In just the same way House Sparrows (*Passer domesticus*) and Chaffinches (*Fringilla coelebs*) were attracted to the *Cotoneaster* berries and fed greedily on them once the Waxwings had started to do so, although they had previously not touched them.) Once the Waxwings had taken to the apples, they fed first on the fallen fruit which they devoured greedily, hollowing out the "shells" in the same way as the Blackbirds had done. (Incidentally, a number of old "shells" had filled up with water and from these the Waxwings drank regularly between spells of feeding.) Several would sometimes feed on the same apple and frequent squabbles would then take place, although no such arguments occurred when they fed on berries. After several days the Waxwings used their acrobatic ability to eat the few remaining apples on the trees, which had clearly been left untouched only because the Blackbirds and Starlings could not reach them. One bird was seen to devour a complete apple about two and a half inches in diameter in only four visits of from five to seven minutes each.

On the question of quantity of food eaten, it is perhaps relevant to include some observations made on a single bird seen feeding on *Cotoneaster* one day between 10.30 a.m. and 1.0 p.m. During this time the number of visits per hour was six (each lasting four or five minutes) and the average number of berries eaten at each visit was 26. This meant that the bird consumed some 390 berries in two and a half hours. The total weight of this amount of berries would be approximately 2½ ounces or about 70 gm., which seems to be as much as a Waxwing itself weighs, judging from two dead ones (killed by a passing car and a small boy's catapult) which were both as fat as butter and tipped the scales at 63 and 71 gm. Since then I have noted that when feeding on guelder rose, or any other juicy berries with a high moisture content, these birds eat even greater weights of berries and appear to digest them still more quickly.

It is thus hardly surprising that seven Waxwings completely stripped a very heavily laden *Cotoneaster* covering 100 square feet of a cottage wall in only two days. Photographs of these seven at work appear on plates 2 and 3. The cottage was beside a road with people passing constantly, but the birds came down regularly to feed and were quite indifferent to traffic and human beings. Plate 1a shows a Waxwing among the fallen apples on the ground and in plate 1c can be seen the bird which devoured a whole apple in four visits (together with the last part of the fruit). The other main food of these particular birds is illustrated in plate 1b which shows a Waxwing resting among the twigs of a guelder rose.

In conclusion, I might add that in April 1959 I watched and filmed some Waxwings feeding on the buds of hawthorn and blackthorn, which were just opening. There was a certain amount of courtship display in which the male hovered in front of the female offering her a beakful of buds. Incidentally, at this time Waxwings were also eating holly berries and beech buds. R. P. BAGNALL-OAKELEY

[With regard to the number of berries eaten by a Waxwing, it is of interest to draw attention to an observation made at Avoch, Ross-shire, by the Rev. J. Lees in December 1943 (*Brit. Birds*, 41: 8). He watched a single bird feeding on *Cotoneaster* and "in one day it devoured as many as 500 berries which weighed approximately 6 oz."—EDS.]

Reviews

The Eleventh Annual Report of the Wildfowl Trust. Edited by Hugh Boyd and Peter Scott. Wildfowl Trust, Slimbridge, 1960. 168 pages; 32 plates. 10s.

The Wildfowl Trust's Annual Report contains, as usual, a varied assortment of news of the collections and wild geese at Slimbridge, brief reports on scientific work in progress and a number of articles ranging from popular accounts of expeditions to full scientific papers.

The number of European White-fronted Geese at Slimbridge reached 5,000 in mid-February. Four out of a total of 129 ringed were recovered on the spring migration, two in Niedersachsen, Western Germany, and two in Poland, the first recoveries in that country of birds of this species ringed in Britain.

Tests of the effectiveness of aerial survey for studying winter populations of wildfowl were hampered by bad flying conditions, and "experience has shown very clearly that in British conditions photographic recording of wildfowl numbers is so difficult and unreliable that it must be subordinated to direct observation". Even so, interesting information was obtained on the numbers of Barnacle and Brent Geese, and there were 7,200 Brents between Southend and Skegness in February 1959. Sorties were made at other seasons to study the moulting congregation of Shelduck in Bridgwater Bay in Somerset, and to look for breeding Grey Lag Geese and ducks in the Highlands. Not more than 65 geese were found and ducks also were scarce, the conclusion being that it was "unlikely that a significant proportion of the British population of ducks breeds in the North-Western Highlands". It should be noted that the survey did not include Caithness, where the numbers are probably greater.

In a paper on "The Shelduck population in the Bridgwater Bay moulting area" S. K. Eltringham and H. Boyd give an interesting account of the only important known moulting area in Britain. The

peak moulting population in the bay was about 2,700 in October, but there was an appreciable passage in the late summer and early autumn before the final build-up of moulting birds, the two groups overlapping, and in early September there were 3,300 birds. Since the local ducks are too few to account for such numbers they are presumed to come from Ireland.

Paul A. Johnsgard contributes a useful paper on "Comparative behaviour of the Anatidae and its evolutionary implications", in which he reviews what is known of their pair formation, pair bond strength and the effects of sexual selection in the various groups, showing how such knowledge has contributed to taxonomic evaluation. Whereas in most of the Anseranatinae and Anserinae the pair bond is normally lifelong, in most of the Anatinae (except the Tadornini) it frequently lasts only for a single breeding season. Young geese and swans usually return to their breeding area and "mate with closely related individuals, resulting in local inbreeding and thus favouring subspeciation (Mayr 1942). Migratory ducks of the genus *Anas*, however, normally mate on the wintering grounds" and the drakes follow their mates to the females' breeding area, so that the populations are mixed and less liable to subspeciation. Also, geese and swans do not attain sexual maturity for several years, and have a longer life cycle than ducks which mostly mature in their first year. This contrast, and also probably the different clutch size in the two groups, has a potential effect on the rapidity of evolutionary adaptation. In the swans, geese and possibly shelducks, the pair bond is permanent and "mate selection normally takes place once only", being a "more gradual process which allows for the 'correction' of incipient mating errors between species". Differences in sexual dimorphism and moult are also discussed.

The first of two papers on the Brent Goose consists of a translation of an article by S. M. Uspenski, which originally appeared in *The Migration of Animals No. I* published by the Academy of Sciences of the U.S.S.R. in 1959, and deals with the breeding status and migration of the various races in the Soviet Union. The numbers of all races seem to be greatly reduced and the dangers from persecution to the survival of the species are greatly aggravated by its apparently very erratic breeding success. In the second paper P. J. K. Burton shows that in sample counts in winter in Essex the percentage of first-winter birds has varied in five winters from 53% in 1957-58 to 0.4% in 1958-59, the sample being of about 1,800 birds in each case. Very low breeding success in 1958 has also been noticed in White-fronted Geese and Bewick's Swans.

In "Lead poisoning in wildfowl" P. J. S. Olney describes the symptoms and course of this complaint. It is thought that 60-80% of wild Mallard with one ingested pellet will succumb if they are

feeding on wild seeds, but the mortality may be less if they are taking aquatic plants. In a large sample in the U.S.A. nearly 7% of Mallard whose gizzards were examined were carrying one or more ingested pellets, and the proportion was similar in a much smaller sample in this country.

Compared with studies of wintering populations relatively little has been done in this country on the breeding biology of ducks in the wild, but in "A breeding population of the Mallard" H. Boyd and B. King discuss the situation at four Somerset reservoirs. Early nesting was almost wholly unsuccessful, apparently because of predation due to lack of cover. The population was more or less static during 1954-56 and about double the average for the period 1948-53. Provisional estimates suggest an annual loss of 57% for adults and of 76% for young in the first year after fledging. There seems to be a clear relationship between numbers in late August and the size of the breeding population in the following spring. It is suggested that if this correlation is real, and general, long-term breeding studies might be carried out by a combination of sex-ratio counts in the spring with total counts in August and September.

It is impossible to review here all the papers in this report, but other subjects include the B.B.C./I.U.C.N. Darwin Centenary Expedition, an interim report on wildfowl food research, the threat posture of Canada Geese, injury-feigning in the Anatidae, the Pink-headed Duck (*Rhodonessa caryophyllacea*), goose-netting in the Netherlands, a spring visit to Denmark and duck-catching in Iceland. R. C. HOMES.

Scolt Head Island. Edited by J. A. Steers. Heffer, Cambridge, 1960. 270 pages; 29 photographic plates, many diagrams and maps. 50s.

The original edition of this book was published in 1934, but it has long been out of print. This 1960 edition contains entirely new chapters, whilst others have been largely rewritten to bring the matter up to date. The plates are all new, many maps and diagrams have been added and aerial photos of the whole area keyed to a large folding map of the island.

The subjects covered in this very attractively produced volume include the physiography and evolution of the island, the plant ecology, lichens, fungi, mammals and marine invertebrates. Thirty-three pages are devoted to birds and this section is by Dr. E. A. Duffey. Very detailed and readable accounts are given of the histories of the terns and other shore birds breeding on this National Nature Reserve. Although nearly 200 species have been recorded on the island, only 14 are regular breeders though a further 15 have bred once or are irregular. Several changes in the breeding status of Scolt birds have been recorded since 1923 when the island was handed to the National Trust.

The Common, Sandwich and Little Terns have shown the greatest total increase in spite of considerable fluctuation in numbers. Up to 2,000 pairs of Sandwich, 2,400 pairs of Common and 180 pairs of Little Terns have nested in a single season. A few pairs of Arctic Terns breed, but no Roseates have nested since 1946. Large numbers of terns have been ringed at Scolt since 1954 and recovery details are given. These reveal that some birds ringed as nestlings spend their first summer in West Africa. A full account is given of the nesting of a pair of Kittiwakes in 1946. The nest, apparently the first recorded on a sandy beach, "was constructed among a group of Sandwich terns . . . but was at first mistaken for a black-headed gull's and the first egg was taken . . ."

The bird section also contains tables showing the seasonal abundance of certain ducks and geese; and the frequency of some migrants and winter visitors. The section on migration indicates that much remains to be discovered and valuable ringing could be carried out at Scolt. This book should persuade more bird-watchers to visit the island in spring and autumn.

The half-dozen bird photographs are well chosen and include one of the historic Kittiwake's nest. M. J. SEAGO.

Recent reports and news

By I. J. Ferguson-Lees and Kenneth Williamson

The items here are largely unchecked reports, and must not be regarded as authenticated records. They are selected, on the present writers' judgment alone, from sources generally found to be reliable. Observers' names are usually omitted for reasons of space and in case a report is subsequently rejected, and none of the items will be mentioned in our annual Index. Readers are asked to submit anything of interest as quickly as possible.

This summary is mainly concerned with the two months from mid-October to mid-December, but it also includes some additions for September and early October and these should be looked at against the background given by the lengthy outline in our November number (pp. 529-544).

AMERICAN SPECIES

Only two American birds were reported after the end of October, apart from the Akeagh Lough dowitcher (p. 534) which stayed until at least the middle of November. The first of these was the only American Passerine reported in a remarkable autumn for American waders—a **Myrtle Warbler** (*Dendroica coronata*) which stayed on Lundy (Devon) from 5th to 14th November. It was trapped and ringed, and at nearly 12 gm. its weight was almost exactly equal to the autumn average for this species as given by Mrs. K. B. Wetherbee (*Bird-Banding*, v: 58-59) on 274 individuals which ranged from 9.2 to 16.4 gm. This suggests that it had been on this side of the Atlantic for some days before it was found on Lundy, unless it was ship-assisted and had managed to obtain adequate food all the way. There is only one previous record of this species in Britain and Ireland, and that was also in Devon where one stayed for over five weeks in January and February 1955 (*Brit. Birds*, 48:

204-207 and plates 25-28). However, there have been at least two records of Myrtle Warblers making almost the complete crossing of the Atlantic until within sight of the Irish coast (*Brit. Birds*, 52: 237-238).

The other American bird to appear during November was an **Upland Sandpiper** (*Bartramia longicauda*) which arrived at the airport on St. Mary's (Isles of Scilly) on the 17th—just 30 days after the one on Skokholm (p. 534)—and stayed there for some time. It seemed to be ailing, could be approached very closely and lived on a grass verge beside a road with continuous traffic. However, we should add here that we have now had details of two more **Pectoral Sandpipers** (*Calidris melanotos*) in mid-September. The first was on Lundy on the 10th and the second on Tory Island (Co. Donegal) on the 14th and 15th. Both were thus in one of the peak periods when six other Pectorals were identified in Anglesey, Caernarvon (Bardsey), Cornwall, Glamorgan and Norfolk (p. 533).

SABINE'S GULLS AND PHALAROPES

Only two **Sabine's Gulls** (*Xema sabini*) were reported after the influx in early October (p. 534), apart from the Portland observations already given and another at St. Ives (Cornwall) on 19th October: an adult at Portavogie (Co. Down) and an immature at Eastney (Hampshire), both on 4th December. The flocks of **phalaropes** (*Phalaropus* spp.) also dwindled rapidly after the middle of October (pp. 529-531), though on 25th October there were still as many as 120 to be seen off St. Agnes (Isles of Scilly) and two days earlier there had been over 30 off near-by St. Mary's. These, like most of the ones reported earlier, were apparently all **Grey Phalaropes** (*Ph. fulicarius*). During November odd birds and small parties were seen regularly on the south coast, particularly in Cornwall, Devon and to a lesser extent Dorset, though also as far east as Sussex and Dungeness (Kent); and a scattering of single birds as far north as Lancashire in the west (one at Lytham St. Annes on the 13th) and Co. Durham in the east (one at Seaham on the 2nd), and also as far inland as Staffordshire and Warwickshire (singles at Blackbrook sewage farm and Shustoke Reservoir on the 12th and 13th respectively). There were still a few to be seen in Cornwall, Devon and Dorset up to 7th December, but since then we have not heard of any phalaropes at all. The grand total reported during this staggering influx has now risen to over 10,000. To the list of inland stragglers during early October (p. 531) we must add a **Red-necked Phalarope** (*Ph. lobatus*) at Ponders End (Middlesex) on the 1st.

INTERESTING PASSERINES

Fair Isle had its second **Lanceolated Warbler** (*Locustella lanceolata*) of the autumn on 1st November and there were several other reports of rarer warblers which it is interesting to look at in comparison with those listed in November (pp. 538-539). A very late **Aquatic Warbler** (*Acrocephalus paludicola*) was identified at Slapton Ley (Devon) on 6th November. An **Arctic Warbler** (*Phylloscopus borealis*) trapped on Tory Island (Co. Donegal) on 1st September has not previously been mentioned, nor has one at the Isle of May (Fife) on 26th August. Incidentally, the two **Icterine Warblers** (*Hippolais icterina*) at the Isle of May on 29th August actually stayed to the 31st and one of them to the 1st September. A **Yellow-browed Warbler** (*Ph. inornatus*) at Fenwick (Northumberland) on 16th October completes the autumn's already long list of that species. Perhaps the most interesting warbler of all, however, even though it was actually the other side of the Channel, was a **Cetti's Warbler** (*Cettia cetti*) trapped on Jersey (Channel Islands) on 16th-17th October. This species nests quite far north in western France, but is normally sedentary.

Reports of other rarer Passerines have included another **Short-toed Lark** (*Calandrella cinerea*) on Fair Isle on 28th November; male **Golden Orioles** (*Oriolus oriolus*) at Enville (Worcestershire) from early September to early October and below the summit of Moel Fammau (North Wales) on 6th November, the latter rather late

and both further north and west than this species usually occurs; a **Desert Wheatear** (*Oenanthe deserti*) at Selsey Bill (Sussex) from late October to 8th November and an apparent **Black Wheatear** (*Oe. leucura*) near Strood (Kent) on 7th November; single **Red-breasted Flycatchers** (*Muscicapa parva*) on St. Mary's Island (Northumberland) on 8th October and at Fife Ness on 17th October, which brought the autumn's total to around 40; **Richard's Pipits** (*Anthus novaeseelandiae*) at Bardsey (Caernarvonshire), Atwick (Yorkshire) and Ynys Llanddwyn (Anglesey) on 18th and 22nd October and 14th November respectively; a **Lesser Grey Shrike** (*Lanius minor*) at Embleton (Northumberland) on 29th October (five days earlier, as already mentioned, p. 540, there was one near Coxhoe in neighbouring Co. Durham); a **Serin** (*Serinus canarius*) at Portland (Dorset) on 12th November and a **Rustic Bunting** (*Emberiza rustica*) on the Isle of May from 29th September to 2nd October.

Firecrests (*Regulus ignicapillus*) actually extended further than we suggested in November (pp. 543-544) because single birds reached Scotland and Ireland, at the Isle of May (Fife) on 22nd September and Cape Clear Island (Co. Cork) on 21st October, only the second and fourth records respectively for these two countries. Firecrests were also seen at Lundy (Devon) on 4th-5th October and 25th-26th November, and at St. Ives (Cornwall) on 9th and 14th November, while other November observations included one at St. Osyth (Essex) on the 27th and the now regular sprinkling at Dungeness (Kent) and Portland (Dorset).

BEARDED TITS, WAXWINGS AND OTHER INVADERS

In the autumn and winter of 1959-60, following a very successful breeding season when the population was unusually high, there was an eruption of **Bearded Tits** (*Panurus biarmicus*) from the reed-beds of East Anglia and parties were recorded as far west as Gloucestershire and Shropshire (*Brit. Birds*, 53: 422-423). Last summer the population was still high in Norfolk and Suffolk and a large number of young were again reared, with the result that, as we mentioned in November (p. 542), the birds again showed signs of breaking out in October. The species has in fact erupted again, but so far the distances covered have not been nearly as spectacular as in 1959-60 and Kent, Middlesex and Hertfordshire seem to be the present limits. Bearded Tits have been reported from about twelve places in Essex—including Walthamstow Reservoirs, where up to 15 were seen from 16th October to at least 12th December, and on the Essex side of Bishop's Stortford, where up to eight stayed from about 28th October to 26th November. Five were trapped and ringed in Kent on 20th November and were still present in December; there was a male at Perry Oaks (Middlesex) from 26th November to the end of the year; two were seen at Broxbourne (Hertfordshire) from 4th November onwards; and four were seen at Wilstone Reservoir (Hertfordshire) on the 13th. During the summer of 1960 over 300 Bearded Tits were ringed at Walberswick (Suffolk) and about half of these were colour-ringed. Anybody seeing a Bearded Tit with a colour ring on one of its legs is asked to get in touch with D. G. Pearson, Gonville and Caius College, Cambridge. Such ringed birds provided the first evidence of movement away from the breeding areas. At Minsmere (Suffolk), for example, a male with a Walberswick ring was seen on 8th August and there were two more there on 18th October. At Minsmere about 18th September the local Bearded Tits began to behave excitedly and fly high into the air, sometimes as much as 300 feet, and they continued this behaviour on most days until the end of October, except when it was windy. Frequent short flights at 100-200 feet were made along the dunes, but such parties were always seen to return, except on 6th October when groups of seven, four and eight moved down the coast until out of sight and did not come back within the next hour. On 25th September a Bearded Tit was seen 20 yards inside the woods at Minsmere!

We mentioned in our last summary (p. 542) that **Waxwings** (*Bombycilla garrulus*) had been seen during October on Fair Isle, in south-east Scotland and at one or two

places on the east coast of England down as far as Kent. In East Lothian in fact, a flock of as many as 40 was seen at Longniddry on 15th November and there were several flocks in the area of Kelso (Roxburghshire) during the first half of November. We have also now heard that small numbers were seen in late October or early November in Inverness-shire and Kincardineshire, but by Christmas there had been no real invasion. The numbers on Fair Isle dropped rapidly away during early November and, though during the rest of that month and in the first three and a half weeks of December small parties were reported from Northumberland, Co. Durham, Yorkshire and Norfolk, the biggest of the very small number of groups reported was only 20 at Middlesbrough from 27th November into December and such a scattering is perfectly normal. The only reports in England away from east coast counties have been single birds at Corby (Northamptonshire) on 14th December and at Sandy (Bedfordshire) on the 24th.

Of the other species that have already been noted as being present in unusual numbers during the late autumn, easily the most widely reported are the **Long-tailed Tits** (*Aegithalos caudatus*). **Great Tits** and **Blue Tits** (*Parus caeruleus* and *major*) have also attracted attention in various parts of England, but increases and movements do not seem to have been on anything like the scale of 1959 (*Brit. Birds*, 53: 140), let alone that of 1957 (53: 49-77, 99-117, 176-192). **Siskins** (*Carduelis spinus*) are widely spread this winter, but there has been little to suggest that the numbers are exceptional following the invasion of these birds in September (pp. 541-542).

A few other species that come in rather a different category might also be mentioned here. It continues to be a good winter for **Great Grey Shrikes** (*Lanius excubitor*); most are in eastern areas, but there are more than usual in SW Scotland (and NW England?) and they have been seen in such inland counties as Derby, Stafford, Huntingdon and Leicester (where there were three in November). **Short-eared Owls** (*Asio flammeus*) are also very numerous in some areas and north of Lincoln a party of about 40 have been feeding and roosting together. There have also been many more reports of **Rough-legged Buzzards** (*Buteo lagopus*) after the October influx we mentioned in November (pp. 537-538). These have been mainly on the east coast, particularly in East Anglia and perhaps especially in Suffolk where at Minsmere and Walberswick, for example, several have been seen at a time. At Minsmere between one and three were noted on seven dates in November and there was one on 4th and 5th December. Further confirmation that there was an influx in the first week of October is provided by an interesting record from quite a different area: about 6th October one landed on board a vessel off the Irish coast; it was brought into Liverpool, and released near Conway (Caernarvonshire) on the 14th.

OTHER RARE OR LESS COMMON SPECIES

There have been rather few reports of the rarer non-Passerines since our last summary and most of those have been aquatic birds. Three **Ferruginous Ducks** (*Aythya nyroca*) were seen in widely separated parts of England during November and December—at Dungeness (Kent) from 8th November, at Leigh Flash (Lancashire) on 9th November and at Holme Pierrepont (near Nottingham) from 8th December to at least the 22nd. Two late **Balearic Shearwaters** (*Procellaria puffinus mauretanicus*) were identified off St. Ives (Cornwall) on 4th December and we take this opportunity of including another report of **Cory's Shearwater** (*P. diomedea*) (*cf.* p. 536)—one seen flying with **Manx Shearwaters** (*P. puffinus*) off Erris Head (Co. Mayo) on 4th September. **Mediterranean Gulls** (*Larus melanocephalus*) were reported from two areas where they are not so regularly seen—a first-winter bird at Atwick (Yorkshire) on 16th October and an immature at St. Ives on 26th and 27th November and 10th December. It should also be noted here that the Mediterranean Gull which has spent each of the last four winters at Hartlepool (Co. Durham) and which reappeared there in August 1960 (*Brit. Birds*, 53: 406) was not seen between 18th September and at least the end of November.

Exceptional numbers of **Little Gulls** (*L. minutus*) at Portland (Dorset) between mid-September and mid-October were noted in our last summary (p. 535) and we now learn that even larger numbers occurred there between mid-October and mid-November. They were observed on 12 days altogether, the maxima being 42 or more on 22nd October, 19 on the 23rd, 27 on the 29th, 29 on 5th November and 12 on the 13th. Little Gulls continued to be reported as far west as Cornwall and in greater numbers than usual in eastern areas where they are more regular. The **Purple Heron** (*Ardea purpurea*) on the Plym Estuary (Devon) remained from 7th to 15th October (not just the 8th and 9th as previously reported).

Lastly, four species of birds of prey. **Kites** (*Milvus milvus*) were seen at Selsey Bill (Sussex) on 1st November and at Minsmere (Suffolk) two days later, and there was a **Goshawk** (*Accipiter gentilis*) on the Bedfordshire/Huntingdonshire border on 5th December. The last of the autumn's **Ospreys** (*Pandion haliaëtus*) was reported from Kingsbridge Estuary (Devon) on 23rd October. There were also two other reports of Ospreys in the fourth week of September, which may have been connected with the influx noted in the middle of that month and mentioned in our last summary (p. 537). These were at Cliffe (Kent) on 24th September and Weir Wood Reservoir (Sussex) from 25th September to 8th October. Another bird of prey concerned in the September influx was the **Honey Buzzard** (*Pernis apivorus*) and so it is of interest to add that an immature male was picked up dead on the roadside between Coventry and Rugby (Warwickshire) on or about 22nd September.

LATE SUMMER VISITORS

A striking feature of the late autumn was the number of late records of certain species of summer migrant and this was probably even more marked than in 1958 (*Brit. Birds*, 51: 531-532). The limelight was undoubtedly stolen by the aerial feeders, the **Swifts** (*Apus apus*) and the Hirundines. No less than 15 reports of Swifts in October reached us as follows: 1st, Par (Cornwall); 2nd, Fishguard (Pembrokeshire) (two), Eye Brook Reservoir (Leicestershire); 3rd, Blakeney Point (Norfolk) (two), Cley (Norfolk), Hartlepool (Co. Durham); 5th, Bedford (Bedfordshire); 8th, Bishop's Stortford (Hertfordshire), Rye Meads (Hertfordshire), Queen Mary Reservoir (Middlesex); 9th, Abberton Reservoir (Essex), Portland (Dorset), Tonbridge (Kent); 27th, St. Margaret's (Kent); 28th, Cley (Norfolk); and 30th, Shellness (Kent). The last two dates are quite extraordinary—and yet another four weeks later, on 28th November, a Swift was reported from Gillingham (Kent). **Swallows** (*Hirundo rustica*) were still being seen in many parts of Britain at the end of October and the beginning of November as far north as Ross-shire, Midlothian and Berwickshire. Stragglers then are of course normal, but the number of them this year seemed far greater than usual and there were still frequent scattered reports up to the third week of November, though by this time the majority were from southern England. In the last ten days of November odd birds were still being seen as far north as Co. Durham and more particularly on the south coast from Kent to Dorset, Devon and Cornwall. In Sussex there was one just over the border from Newenden (Kent) on 1st December and one at Lancing on the 2nd. As far north as Yorkshire one was seen at Hornsea on 3rd December and there were two at Hornsea Mere on the 4th. The latest report of all came from Minsmere (Suffolk) where one was seen on 6th December after there had been two on the 2nd. The same locality produced the last reports of **House Martins** (*Delichon urbica*) with two on 7th and 8th December. House Martins were not as numerous as Swallows during November and there were far less reports after the middle of that month, but they were also noted in Kent and Devon to 5th December. **Sand Martins** (*Riparia riparia*) normally leave much earlier than the other two species of Hirundines and November reports are quite exceptional, but one was seen at Chattenden (Kent) on 6th November and, still more remarkable, there was one at Widnerpool (Nottinghamshire) on 1st December.

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